SOLUTIA
Applied Chemistry, Creative Solutions

Solutia Inc.
10300 Olive Boulevard
P.O. Box 66760
St. Louis, Missouri 63166-6760
Tel 314-674-1000

March 10, 1999

Mr. Michael McAteer
U. S. EPA - Region 5
77 West Jackson Boulevard (SR-6J)
Chicago, Illinois 60604-3590

Re: Sauget Sites Area I - January 21, 1999 Administrative Order by Consent
- **Notification of Contractors and Contractor Qualifications**

Mr. McAteer,

Pursuant to Section V.1. "Designation of Contractor, Project Coordinator, On-Scene Coordinator or Remedial Project Manager," of the Sauget Sites Area I, January 21, 1999 Administrative Order by Consent, listed below are contractor names, project work areas, and project directors for USEPA review and approval. As described in paragraph 1, these contractors are, "...other contractors or subcontractors retained to perform work under this Order". Also enclosed are qualifications for the key project personnel.

Contractor	Work Area	Project Director
O'Brien & Gere Engineers, Inc.	EECA & RIFS Sample Collection (FSP/QAPP / HASP/ Data Report)	Dean L. Palmer
Savannah Laboratories	Sample Analysis	Janette D. Long
Environmental Standards	Data Validation	Katherine Blaine
ENSR	Human Health Risk Assessment	Lisa J. N. Bradley
Menzie-Cura & Assoc.	Ecological Risk Assessment	Charles A. Menzie
Roux Associates, Inc.	EECA Report / RIFS Report	John R. Loper

Please acknowledge USEPA's approval of these contractors.

Sincerely,

D. M. Light
Project Coordinator
Solutia Inc.

cc:

(w/o enclosures)
M. Foresman - Solutia
B. Yare - Solutia
(w/ enclosures)
B. Gilhousen - Solutia
J. Nassif - Thompson Coburn

O'Brien & Gere Engineers, Inc.

Sample Collection
New and Historical Data Compilation

Project Team Resumes

O'Brien & Gere Engineers, Inc.

Dean L. Palmer, PE
Vice President

PROJECT ASSIGNMENT

Project Officer

PROFESSIONAL PROFILE

Mr. Palmer has over 40 years of engineering experience. As Vice President, he provides overall program direction to engineers and scientists engaged in various projects, including hazardous waste management, asbestos evaluation and remediation, environmental liability assessments and audits, water studies, supply, treatment, transmission, distribution, and storage, wastewater investigations and facilities planning, combined sewer overflow (CSO) collection, conveyance, and treatment facilities, and power systems engineering for both municipal and industrial clients. Mr. Palmer maintains executive responsibility for quality control and technical oversight, as well as budget and schedule adherence, for a variety of projects.

EDUCATION

AAS/1957/

REGISTRATIONS

Professional Engineer in MO, NY, IL, MI, AL, IN, IA, KS, NC, LA, SD, AR, GA, KY, WI

REPRESENTATIVE PROJECTS

HAZARDOUS WASTE MANAGEMENT:

Mr. Palmer has directed comprehensive site evaluation and remediation programs for industries nationwide, including sites impacted with polychlorinated biphenyls (PCBs), petroleum products, heavy metals, and volatile organics.

Mr. Palmer's hazardous waste management experience includes:

- PCB containment design
- hazardous waste impoundment closure
- air emissions inventories
- closure plans
- environmental audits
- soil and ground water remediation
- underground storage tank management
- sampling and analysis
- regulatory and permitting issues

Representative projects include:

Solutia Inc., John F. Queeny; St. Louis, MO - Developing a work plan to conduct a Resource Conservation and Recovery Act facility permit. Activities include database development, interpretation of previous pump tests, well construction log interpretation, ground water elevation monitoring, hydrogeologic data interpretation, summary of existing analytical data, and summarizing into a formal work plan.

Solutia Inc.; Anniston, AL - Project involved the design of a storm water holding basin and conveyance system and the stabilization of PCB constituents on a 7-acre parcel.

Monsanto Company; Anniston, AL - Project consisted of the demolition of over 40 houses and the design and construction of a cover, earthen berm, and storm water drainage on a 40-acre parcel.

Monsanto Company; East St. Louis, IL - Project consisted of collecting leachate from a landfill located in a high ground water gradient location.

Jefferson Smurfit Corporation; Nationwide - Project consisted of performing site emissions inventory and characterization and a compliance evaluation of up to 180 facilities across the nation. Project included a site inspection, identifying point and fugitive sources of emissions, reviewing Material Safety Data Sheets data, reviewing facility air permits, identifying permitted and unpermitted sources, calculating potential emissions, and conducting a compliance review of the facility with respect to the appropriate state and federal air emission control regulations.

Monsanto Company, John F. Queeny Plant; St. Louis, MO - Project consisted of a subsurface assessment for tetrachloroethene- and trichloroethene-impacted soil and ground water. Project included preparation of a Health and Safety Plan and Sampling and Analysis Plan; ground water elevation survey and ground water sampling of existing monitoring wells; ground water sampling via hydraulic probes (Geoprobes™); soil sampling using conventional hollow stem auger techniques; and report preparation.

Monsanto Company, John F. Queeny Plant; St. Louis, MO - A light non-aqueous phase liquid (LNAPL) assessment for the presence of toluene and other volatile organic compounds (VOCs) in ground water was performed. Project included completion of cone penetrometer testing, piezometer installations, a ground water elevation survey, ground water sampling via the piezometers and hydraulic probes (Geoprobes™); and preparation of a ground water elevation contour map, a concentration contour map, and an engineering report.

Monsanto Company, John F. Queeny Plant; St. Louis, MO - Involved a bedrock investigation for the presence of dense non-aqueous phase liquids (DNAPLs). Project included ground water monitoring well installation using overburden drilling, rock coring, and air rotary drilling techniques; subsequent well development and sampling; and report preparation.

Lambert-St. Louis International Airport; St. Louis, MO - Development of Spill Prevention Control and Countermeasures Plan (SPCC) for Airport operations and maintenance. Developed contingency plan to deal with oil spills, including response requirements and notifications. Subsoil investigations located a plume of impact on the Airport property under the East Terminal expansion which was designed, funded, and approved for construction. Further investigation and coordination with the review agencies achieved approval by the state agency for natural attenuation of the constituents which allowed the construction of the expansion to proceed without major delays.

City of St. Louis Board of Public Service; St. Louis, MO - Underground storage tanks (USTs) at dozens of City facilities including the Airport, the Water Division, parks, etc. Project includes assessment, prioritization, regulatory coordination, removal, replacement, and remedial activities.

Sherwood Medical Company; El Reno, OK - Phase I and Phase II Environmental Liability Assessment (ELA) of a former latex catheter manufacturing plant to assess environmental liabilities in the building or on the property as a result of past activities. Responsibilities included collection and review of background and regulatory data, on-site investigation, and preparation of a summary report.

Sherwood Medical Company; El Reno, OK - Conducted Phase III Remedial Measures program at a former latex catheter manufacturing plant. Responsibilities included preparation of specifications for asbestos-containing flooring repairs, floor drain plugging, and concrete floor sealing. Also provided construction review and oversight services.

Hertz Corporation; Nationwide - Nationwide survey of vehicle wash facilities at Hertz Corporation rental facilities for compliance with the Clean Water Act. The investigations included inspection of vehicle wash areas, vehicle exit areas, facility drainage systems, and water reclamation facilities. Conceptual remedies for noncompliant issues were also identified.

U. S. Air Force; Whiteman Air Force Base, MO - Interim Remedial Measure (IRM) at former chlordane application areas under the Installation Restoration Program to assess the extent of and remove chlordane-impacted soils at several housing units at Whiteman AFB. Project responsibilities included field and office staff oversight and coordination, environmental sampling during the Remedial Investigation/Feasibility Study (RI/FS) and review of pertinent documents and reports. Remedial actions undertaken during the IRM included excavation of approximately 1800 cu yd of impacted soil from around the housing units in accordance with Missouri Department of Health guidelines and construction of containment cells in which the excavated soil was stored. Final remediation alternatives evaluated during the FS included natural attenuation (no action), low temperature thermal desorption, soil washing, and bioremediation.

U. S. Air Force; Whiteman Air Force Base, MO - A Treatability Study for the remediation of chlordane-impacted soil. Project responsibilities included office coordination and supervision of project tasks which included identifying applicable treatment technologies (low temperature thermal desorption, soil washing, and bioremediation), and preparing an Engineering Evaluation/Cost Analysis (EECA) plan. Tasks included bench scale and pilot scale development, startup, and operation; preparing data management deliverables in accordance with the Installation Restoration Program Information Management System (IRPIMS); and preparing treatability system manuals.

Metropolitan St. Louis Sewer District (MSD); St. Louis, MO - Phase I, Phase II, and Phase III ELAs of seven MSD sites, including former wastewater treatment facilities and a maintenance yard. Phase I ELAs consisted of background research, regulatory research, and site investigations to identify past and present land uses and possible sources of environmental impact as a result of MSD activities at each site. Phase II ELAs consisted of soil borings and sample analysis for the presence of metals in former lagoons and sludge drying beds; soil borings and sample analysis for the presence of benzene, toluene, ethylbenzene, and xylenes (BTEX), volatile organics, and total petroleum hydrocarbons (TPH) in former oil, diesel fuel, and gasoline

storage areas; and, a limited asbestos survey. Phase III ELAs consisted of soil borings, ground water monitoring wells, and sample analysis for the presence of BTEX and herbicides in a former pesticide storage area.

Sherwood Medical Company; Norfolk, NE - A Remedial Investigation (RI) Report and a Feasibility Study (FS) Report for a Superfund National Priorities List site. The RI Report characterized the physical attributes of the site, the nature and distribution of volatile organic compounds in the site media, and constituent fate and transport. The FS Report presented the development, screening, and detailed analysis of alternatives for the remediation of impacted soil and ground water. Assisted the preparation of a Treatability Study Report on the remediation of soils using in-situ soil vapor extraction.

Metal Chain Manufacturer - Fast-track design, construction, equipment purchase, and operation supervision for treating a 33 million gallon hazardous waste lagoon (metal plating waste) including neutralization, post treatment facilities prior to discharge to city sanitary sewer, delisting and closure of lagoon.

National Food Manufacturer - Program Manager for UST site assessments for nine facilities involving 125 tanks throughout the Midwest; included review of site and construction plans, evaluation of testing methodologies relative to state and local requirements, and coordination/scheduling with local personnel.

National Glass Manufacturer - Project Manager for study, analysis and design of industrial landfill closure in Jefferson County, MO; included sampling and analysis of surface and ground water as well as construction management services to oversee closure of the cell.

Transformer Manufacturer - Industrial waste treatment process to remove metals and other particulate matter from waste stream; included provision for recycle as well as emergency storage and release to receiving stream. Discharge met state and federal permit standards.

Computer Manufacturer - Designed and supervised construction of emergency hazardous waste containment facility including ground water collectors, liners, underdrains monitoring system and a waste return pumping station to prevent leakage to the ground water aquifer.

Industrial Waste Treatment Plant - Study, contract document development, and supervision of removal of hazardous waste including stored product and impacted soil; installation of ground water wells to monitor possible effect on the ground water aquifer.

Metal Plating Industry - Closure of a plating waste lagoon by in situ method including ground water assessment program to ascertain long-term effect on ground water aquifer.

Superfund Site; Dutchtown, LA - Remediation of site involving volatile organics in basins and in the ground water. Detailed cost estimates provided to USEPA, U.S. Army Corps of Engineers, and the state.

Brewery - Environmental audit of industrial operations. Prepared manual for use in facilities for training personnel to avoid injuries to humans or the environment.

Metal Foundry - Program Manager for design and on-site management of a PCB, heavy metals spill cleanup involving the removal of 13,000 cu yd of impacted oil.

National Pet Food Company - Program Manager for tank site assessment and testing program for 38 sites involving 88 tanks throughout the U. S.; site remediation for 9 of the sites.

National Department Store Chain - Program Manager for design and field management of various USTs and remediation of impacted soil and ground water.

Military Base - Sample soils, evaluate analyses, and design of remediation for chlordane impact in an officers' housing installation.

Military Base - Turnkey operation to sample, identify, design remediation measures, and oversee cleanup procedures (including soil farming) for removal of soil impacted with volatile organics.

Military Installation - Site investigations on abandoned missile sites to identify possivle environmental concerns that were not previously addressed.

AIR QUALITY MANAGEMENT:

Hospital - Air sampling and analysis of multiple boilers and stack emissions and preparation of application for operating permits.

Appliance Manufacturer - Air sampling of all stack emissions for compliance with state regulations.

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers
American Water Works Association
Missouri Society of Professional Engineers
Missouri Water Pollution Control Assn., Inc.
National Society of Professional Engineers
The Engineers' Club of St. Louis
The Society of American Military Engineers
Water Environment Federation

SPECIAL QUALIFICATIONS

40 Hour OSHA Supervisors Training

O'Brien & Gere Engineers, Inc.

Alan J. Cork, PE
Senior Project Engineer

PROJECT ASSIGNMENT

Project Manager
Field Leader
Site Safety & Health Officer

PROFESSIONAL PROFILE

Mr. Cork has performed the project management and field work associated with site investigation activities for both private and public sector clients under RCRA and CERCLA.

YEARS OF EXPERIENCE

With O'Brien & Gere: 8
With Other Firms: 0

EDUCATION

MS/1997/Civil Engineering
BS/1990/Civil Engineering

REGISTRATIONS

Professional Engineer in MO

TECHNICAL EXPERTISE:

- Storm water/wastewater management
- Sanitary sewer design
- Hazardous waste management
- Solid waste management
- Air pollution management
- Environmental site assessments

REPRESENTATIVE PROJECTS

HAZARDOUS WASTE MANAGEMENT

Peper, Martin, Jensen, Maichel, and Hetlage; St. Louis, MO - Performed site management and oversight activities associated with a site investigation of a property that was suspected to be a drum disposal site. Activities included directing excavation activities for completion of test trenches and documentation of the findings, as well as collection of environmental samples for analysis.

US Air Force; Whiteman, AFB, MO - Performed the preparation of the Health and Safety Plan and the Conceptual Site Model for an IRP project involving the development of a treatability study for chlordane-impacted soils excavated under a separate project. Additional pesticide-impacted soils were also included within the scope of the effort. Also assisted in the development of the Treatability Study Test Plan, Engineering Evaluation/ Cost Analysis, and Decision/Closure Documents which were used as guidelines for the activities associated with the completion of the treatability study. Most recently acted as the Project Manager for this Delivery Order performing day-to-day management activities.

US Air Force; Whiteman, MO - Performed the preparation of a Work Plan and Quality Assurance Project Plan in accordance with the guideline as specified under the IRP for an Interim Remedial Measure. Other responsibilities included collection of soil, sediment, and surface water samples for analysis to assess the extent of impact, oversight of the remedial efforts at the site, design of a soil storage facility for excavated soils, input of data generated in to the USAF IRPIMS database, organization of the data generated into informal technical information reports (ITIRs), preparation of a Defense Priority Model ITIR for the site, preparation of R & D status reports, and review of the technical report and decision documents prior to submittal.

US Air Force; Cape Canaveral Air Force Station, Florida - Contributed to base-wide site investigation program being performed under the Installation Restoration Program (IRP). Major activities included collection of soil, ground water, and soil gas samples for organic and inorganic analyses. Also installed and surveyed piezometers to assess ground water flow directions at a number of sites.

US Air Force; Newark AFB, OH - Assisted in the development of a cost proposal for the statement of work to support the IRP. Also developed the project work plan and field sampling plan in accordance with IRP guidelines for a site investigation effort to identify CFC-113 impact of the soil and ground water under a series of clean rooms.

PPG Industries, Inc.; Crystal City, MO - Performed services as an environmental advisor for PPG during the auction and liquidation of equipment within the Works No. 9 Plant in Crystal City, as well as addressing any concerns with the closure of the facility. Worked with the management of PPG on both the plant and corporate levels. Responsibilities included identification of environmental concerns, collection of environmental samples for analysis, addressing regulatory concerns on both the state and federal levels, performance of a ground water monitoring well condition inventory, implementation of a hydrogeological investigation of a dense non-aqueous-phase liquid (DNAPL) plume, preparation of reports outlining the findings of ground water and soil investigations, presentation of investigative findings to the MDNR, and addressing of MDNR comments on submitted reports.

Kraft General Foods; New Ulm, MN - Performed quarterly ground water monitoring in support of requirements established by the Minnesota Pollution Control Agency (MPCA) for the site investigation associated with a previously removed leaking underground storage tank (UST). Oversaw the installation of shallow ground water monitoring wells to assess the extent of previously detected petroleum impact. Performed a limited volatile organic compound (VOC) survey of structures and sewers surrounding the former location of the leaking UST. Oversaw the closure of the shallow ground water monitoring wells after site closure approval was granted from the MPCA.

Kraft General Foods; Buena Park, CA - Performed quarterly ground water monitoring in support of requirements established by the Orange County Department of Environmental Health and Safety. Oversaw the installation of shallow ground water monitoring wells to assess the extent of previously detected VOC ground water impact. Also, performed a sampling effort to confirm the presence of a PCB transformer within the facility, as well as performing an investigation of appropriate disposal options for the contents of a surface skimmer catch basin containing edible oils and sludge.

Kraft General Foods; Merrill, WI - Developed a site investigation (SI) report in accordance with the applicable Wisconsin Department of Natural Resources (WDNR) regulations. The SI report presented the results of a UST removal effort at the facility and was submitted to WDNR's Leaking Underground Storage Tank Division after Kraft review.

Nixdorff-Lloyd Chain Company; Maryville, MO - Performed quarterly ground water monitoring in support of a Resource Conservation and

Recovery Act (RCRA) corrective action associated with the closure of a spent pickle liquor surface impoundment.

Moog Automotive; Maryville, MO - Performed quarterly ground water monitoring in support of a RCRA corrective action associated with the closure of waste process water lagoons which contained low pH liquids, as well as heavy metals such as lead, chrome, and mercury.

City of St. Louis; St. Louis, MO - Performed site inspection of the removal of two 10,000-gal diesel fuel USTs, one at the North Refuse Garage and one at the South Refuse Garage. Performed quantity estimates for payment of subcontractor, as well as inspection of the removal activities.

SOLID WASTE MANAGEMENT

Poepping, Stone, Bach & Associates, Solid Waste Management Plan; Adams County, IL - Assisted in the preparation of two sections of the Solid Waste Management Plan. The sections dealt with landfilling and transfer station options for Adams County involving development, construction, and operating costs for two conceptual landfill designs which were included in the section on landfills.

PPG Industries, Inc.; Crystal City, MO - Performed design and construction inspection activities associated with the closure of the landfill at the Works No. 9 facility in Crystal City. Responsibilities included oversight of boring operations and ground water monitoring well installation by a subcontractor; collection of soil, surface water and ground water samples for analysis; collection of split soil, surface water and ground water samples with the MDNR Environmental Services Division for MDNR's preliminary assessment site investigation of the landfill; preparation of reports documenting the events and findings of investigations.

AIR POLLUTION MANAGEMENT

Jefferson Smurfit Corporation (JSC), Folding Carton Division; Morris, IL - Assisted in the completion of a Title V air permit application for a Folding Carton facility which performs gravure printing utilizing high VOC-containing inks. Also addressed Illinois Environmental Protection Agency (IEPA) comments and assisted in the review of the draft CAAPP permit issued for the facility.

Ford Motor Company, Hazelwood, MO - Prepared a Title V Part 70 air emissions operating permit application for an automobile assembly plant. The project included a comprehensive source and air emissions inventory and report. Applicable federal, state, and local regulations were identified and an assessment of compliance performed. A stack and exhaust vent inventory database was constructed, including stack identification, emission sources, coordinates, elevations, flow rates, and temperatures.

Also have assisted in the completion of Annual Emissions Inventory Questionnaire for the facility.

Jefferson Smurfit Corporation, Container Division; Nationwide - Project Manager of an air emission inventory and operating permit strategies program for the 60 facilities in JSC Container Division. Duties included oversight of site inspection teams, site inspection of at least half of the facilities, tracking of costs, review of reports generated for the project, completion and review of minor source operating permit applications for facilities, coordination between the 8 participating offices of O'Brien & Gere and the main technical contact between the client and O'Brien & Gere for the project. In support of this program, currently perform ongoing annual reporting and construction permit application preparation on an on-call basis for the Container Division.

City of St. Louis, Lambert-St. Louis International Airport; St. Louis, MO - Performed ambient air sampling of a pipe chase in the Airport boiler house for % oxygen, carbon monoxide, lower explosive limit, methane, and hydrogen sulfide. Reportedly an odd odor had been noted emanating from the chase which had recently been accessed by Airport maintenance staff. Air sampling was performed to indicate if a health, safety, or environmental hazard existed as a result of the odor.

ENVIRONMENTAL SITE ASSESSMENTS (ESAs)

The Stroh Brewery Company; Detroit, MI - Performed a Phase I ESA in accordance with American Society of Testing and Materials (ASTM) Standard Method E 1527 (Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process) and a compliance audit of a 762,000-sq ft Stroh Brewery with 30 acres of surrounding land located in St. Paul, MN. The brewery reportedly began operations in 1865. Primary concerns associated with the facility included management of petroleum products and solvent-based inks, existing and former USTs, existing oil/sand separator, potential presence of PCBs in hydraulic and electrical equipment, presence and management of potential asbestos-containing materials (ACM), presence of past disposal areas on-site, facility's RCRA small quantity generator status, historical spills, notice of violations associated with air emissions from the facility, status of the facility's permitted storm water and industrial wastewater discharges, status of the facility's storm water pollution prevention plan and areas that should be incorporated into the plan, presence of an old process water well which may not have been abandoned properly, and surrounding sites that could have the potential to impact Stroh's property. Duties included performing site reconnaissance, contact with applicable regulatory agencies, completion of a report summarizing the findings and development of costs for recommended corrective actions.

Nabisco, Inc.; East Hanover, NJ - Performed project management duties associated with Phase I ESAs at two Nabisco distribution facilities that were to be closed - one in St. Louis, MO and one in Cairo, IL. The ESAs

included use, treatment, storage, and disposal or generation of hazardous substances or petroleum products, as well as the presence of potential PCB-containing electrical equipment, ACM, and lead-based paint.

Jefferson Smurfit Corporation; Chattanooga, TN - Performed project management of a limited Phase II ESA at the closed facility involving investigation of two USTs that had previously been closed in place, a former waste oil storage area, loading ramps constructed of fill materials, and a limited site-wide sampling to assess the possibility of potential impacts to the environment.

Jefferson Smurfit Corporation; Lockland, OH - Performed project management of a limited Phase II ESA at the closed facility involving the investigation of unknown drums of material left at the facility, as well as investigation of potential impacts from an adjoining property.

Jefferson Smurfit Corporation; Columbus, OH - Performed project management of Phase II and III ESAs and remedial activities at a Smurfit Recycling Company facility acquired through a property transaction. Issues included an old oil/water separator system which had leaked and various areas around the facility that had been sprayed with waste oil over 25 years. Phase II and III activities included surface and subsurface soil sampling and ground water sampling and excavation of select waste oil application areas. Remedial activities included removing the oil/water separator.

Jefferson Smurfit Corporation; Highland, IL - Performed project management duties associated with an asbestos survey and UST investigation at the Container facility.

Jefferson Smurfit Corporation; St. Paul, MN - Performed project management activities associated with an ongoing subsurface investigation at a Folding Carton facility. Activities included the installation of additional ground water monitoring wells, collection of soil and ground water samples for analysis, comparison of analytical results with past results collected, and completion of a report of the findings. The project was being reviewed by the MPCA.

Consolidated Electrical Distributors; San Diego, CA - Performed a Phase I ESA of a vacant warehouse building and surrounding property in Wichita, KS that Consolidated Electrical Distributors was contemplating purchasing. Activities included investigation of the warehouse building and surrounding property to assess the presence or potential presence of hazardous materials that may have been used, released, spilled, or disposed at the facility. Historical uses of the property, as well as that of the surrounding properties, was also investigated through the review of aerial photographs and state and federal regulatory databases.

Marksman, Inc.; Cincinnati, OH - Performed project management and client coordinator activities in association with an asbestos survey of a

were performed in accordance with ASTM Standard Method E 1527 and included a records review, site reconnaissance, and interviews with Nabisco personnel. To assess potential environmental concerns at each site, a review of past and present uses of the property, adjoining parcels, and surrounding properties and visual observations of structures and surrounding grounds were performed. Issues of concern included use, treatment, storage, and disposal or generation of hazardous substances or petroleum products, as well as the presence of potential PCB-containing electrical equipment and ACM.

KASCO Corporation; St. Louis, MO - Performed project management duties associated with a Phase I ESAs at a former machine shop facility that KASCO was acquiring in St. Louis, MO. The ESA was performed in accordance with ASTM Standard Method E 1527 and included a records review, site reconnaissance, and interviews with KASCO personnel. To assess potential environmental concerns at each site, a review of past and present uses of the property, adjoining parcels, and surrounding properties and visual observations of structures and surrounding grounds were performed. Issues of concern included use, treatment, storage, and disposal or generation of hazardous substances or petroleum products, as well as the presence of potential PCB-containing electrical equipment and ACM.

Brown Group, Inc.; St. Louis, MO - Performed project management and production duties associated with Phase I ESAs at two Brown Shoe Company facilities that were to be closed—one in Steelville, MO and one in Charleston, MO. The ESAs were performed in accordance with ASTM Standard Method E 1527 and included a records review, site reconnaissance visit, and interviews with current employees. To assess potential environmental concerns at each site, a review of past and present uses of the property and adjoining parcels, review of environmental regulatory activities associated with the property and surrounding properties, and visual observations of structures and surrounding grounds were performed. Issues of concern included use, treatment, storage, and disposal or generation of hazardous substances or petroleum products, as well as the presence of potential PCB-containing electrical equipment and (ACM).

Jefferson Smurfit Corporation; Nationwide - Performed project management duties associated with Phase I ESAs for JSC in California, Indiana, Iowa, Ohio, and Tennessee. These ESAs were performed in accordance with ASTM Standard E 1527. Three of the six ESAs were performed at facilities that JSC was purchasing, while the other three ESAs were performed at facilities that JSC was selling. The ESAs included a records review, site reconnaissance visit, and interviews with current and past facility employees. To assess potential environmental concerns at each site, a review of past and present uses of the property and adjoining parcels, review of environmental regulatory activities associated with the property and surrounding properties and visual observations of structures and surrounding grounds was performed. Issues of concern

O'Brien & Gere En ıe

PROJECT ASSIGI

Project Geologist

PROFESSIONAL P

Mr. Wright has been responsible for geolo, al analysis, site investig, and sampling associa private and public sec clients.

YEARS OF EXPERI IC

With O'Brien & Gere:
With Other Firms: 2

EDUCATION

BS/1980/Geology; Phy:

1988/Hydrogeology

1980/Geophysical Prosp

REGISTRATIONS

Registered Geologist: M
#RG-0685; IN #1930

former corrugated box manufacturing facility in Lockla Marksman, Inc. was contemplating purchasing.

RC Cement Co., Inc.; Bethlehem, PA - Project Manager of e site assessments and permit reviews for four cement manufa. located in Missouri, Kansas, Pennsylvania, and Tennessee. of the assessments was the identification of environmental an assessment of regulatory compliance. Issues of concern waste landfills, raw materials storage areas, process water hazardous waste management. Responsibilities include management of the project, site visits, report preparation, and

Riezman & Blitz; St. Peters, MO - Performed project ma production associated with followup work in conjunction that had been previously performed by O'Brien & Ger included investigation of the integrity of an oil/water separ performance of dye testing to verify drain and separator c sanitary sewer system. Also oversaw the cleaning of separator by an outside contractor.

Smith, Hulsey and Busey; Jacksonville, FL - Performed an associated with a property transaction, of an 875-acre site chemical manufacturer in Tuscola, IL. The facility many linear low, and low density polyethylene, polypropylen specialty chemicals, such as alcohols. Items of concern during the site assessment included a water/wastewater former on-site disposal areas for fly ash and gypsum, a well, a former wastewater pretreatment lagoon, and curr hazardous waste storage areas. A number of the sites we under agreements with the IEPA.

Hertz Corporation; Park Ridge, NJ - Performed Clean Wa compliance audits of Hertz rental car and rental equip throughout the midwest and douthwest United State compliance audits encompassed investigations of the facil sanitary sewer system discharges through the review of a plans, field observations, Hertz personnel recollection, an appropriate facility sewer lines.

Green, Hoffmann, and Dankenbring; St.Louis, MO - Pe management and production activities associated with an clothing manufacturing operation in the St. Louis area in a property transaction. The main items of concern were possible ACM and lighting ballasts suspected of contai

Sonnenschein, Nath, and Rosenthal; St. Louis, MO - Pe to previously completed ESAs for a hardware store cha Missouri, Illinois, Tennessee, Indiana, and Ohio as res transaction. Items of concern included ACM, PCBs, wa fluids management.

possible soil and/or ground water impact from two gasoline USTs. Th investigation included the installation of a number of monitoring wells soil and ground water sampling, and in-situ hydraulic conductivity tests The results of the investigation were analyzed to delineate the vertica and horizontal extents of environmental impact.

St. Louis, MO - Conducted a hydrogeologic investigation at tw department store facilities to ascertain the existence of possibl soil/ground water impact associated with the storage of fuel oils i USTs. The investigation included soil borings, soil and ground wate sampling, ground water monitoring well installation, and in-sit hydraulic conductivity tests. The results of the investigation wer analyzed to delineate the vertical and horizontal extent of possibl environmental impact.

Lena, IL - Conducted ground water sampling and supervised th removal of gasoline-impacted soils to an approved landfill facility Supervised site restoration to meet facility manager's approval.

Wilson, NC - Conducted ground water sampling and ground wate elevation measurement of 27 ground water monitoring wells.

Manchester, MO - Supervised field activities associated with continuing ground water investigation. Activities included using a rotary drilling methods for monitoring wells to 165 feet below grad bedrock profiling in a creek bottom; additional soil borings; shelby tub sampling of soils; ground water sampling for metals, volatile organi compounds (VOCs), and chromium; and, soil borings within manufacturing facility.

Indianapolis, IN - Conducted an hydrogeologic investigation at warehouse facility to delineate vertical and horizontal extents of soil an ground water impact. The investigation included installation of seve additional monitoring wells located within the warehouse facilit performing hydraulic conductivity tests, and developing ground wat contour maps.

Jacksonville, IL - Supervised installation of five ground wat monitoring wells at a former UST to delineate vertical and horizont extents of possible ground water impact.

Champaign, IL - Conducted hydrogeologic investigation at a form UST location to ascertain the existence of soil and/or ground wat impact. The investigation included soil borings, monitoring we installation, and ground water analysis.

Houston, TX - Supervised installation of soil borings and ground wat monitoring wells in a continuing hydrogeologic investigatio Performed ground water hydraulic conductivity tests and ground wat sampling.

St. Louis, MO - Supervised soil borings and ground water monitoring well installation at four sites within the City for a utility. The investigation was to delineate the horizontal and vertical extents of possible environmental impact.

Cleveland, OH - Supervised the installation of five soil borings and ground water monitoring wells for a continuing hydrogeologic investigation. Conducted ground water sampling of monitoring wells.

Buena Park, CA - Sampling of ground water monitoring wells at a food processing facility as part of a continuing hydrogeologic investigation. Installation of 50-foot ground water monitoring wells using percussion hammer drilling technique.

Keokuk, IA - Conducted a hydrogeologic investigation at a landfill site. The investigation included soil borings and the installation of ground water monitoring wells. Soil and water samples were obtained and analyzed. Results were analyzed to delineate landfill conditions and extent of possible environmental impact.

Sullivan, MO - Supervised the drilling of soil borings and the installation of ground water monitoring wells. Air rotary methods were used for monitoring well borehole drilling to a maximum depth of 560 feet. The air drilling was accomplished by staged decreasing bit size and setting shallow and intermediate steel casing.

Norfolk, NE - Participated in a soil vapor extraction evaluation study to test as a possible remediation technique.

Prior To O'Brien & Gere:

Midland, MI - Conducted initial site investigations of numerous sites along a brine pipeline and at extraction wells. The investigation included establishing a grid pattern for conducting a surface conductivity survey and performing the survey utilizing a Geonics EM-31 conductivity instrument.

Supervised the drilling and installation of approximately 125 monitoring stations including collection and description of soil samples. Subsequently performed a conductivity and gamma ray logging of monitoring stations, including the computer processing of collected logging data. Logged approximately 250 monitoring stations.

Supervised the drilling and installation of four-inch ground water extraction wells. This included the installation of pumps, associated wiring, connection of collection lines and trenching collection lines to collection cisterns.

SPECIAL QUALIFICATIONS

OSHA Refresher Training Course
OSHA Supervisor Course
Missouri Permitted Well Driller and Pump Installer

PROFESSIONAL AFFILIATIONS

Association of Ground Water Scientists and Engineers

O'Brien & Gere Engineers, Inc.

Saunders E. Wilson, Jr., CIH, CSP
Technical Associate

PROJECT ASSIGNMENT

Associate for Safety & Health

PROFESSIONAL PROFILE

Mr. Wilson is manager of the Health and Safety Program for O'Brien & Gere Engineers, Inc. As manager of the Health and Safety Program, Mr. Wilson audits ongoing activities to identify health and/or safety hazards and recommends corrective actions. Mr. Wilson investigates occupational accidents and work related illnesses, identifies causes and recommends corrective and preventive measures. Mr. Wilson monitors the execution of the Medical Surveillance Program and the provision of regulatory based training, such as that required for general employee hazard communication training, hazardous waste operations training and asbestos worker training.

YEARS OF EXPERIENCE

With O'Brien & Gere: 10
With Other Firms: 20

EDUCATION

MS/1974/Hygiene, Industrial Hygiene

BS/1969/Sanitary Engineering

REGISTRATIONS

Certified Safety Professional

TECHNICAL EXPERTISE

Mr. Wilson has been a task or project manager on a number of multi-component environmental compliance projects for Fortune 100 and smaller companies, as well as for local governmental agencies. His accomplishments include:

- developing and monitoring the implementation of health and safety plans and procedures at work sites, including sites containing hazardous wastes
- developing and conducting Hazardous Waste Operations Safety and Health training
- developing and conducting Hazard Communication and Laboratory Chemical Hygiene training
- conducting Confined Space Entry training
- performing health and safety program audits
- developing, supervising, and performing industrial hygiene exposure monitoring
- developing, supervising, and performing environmental and workplace noise and indoor air quality evaluations
- developing and evaluating the health and safety plans and procedures at client work sites, including sites containing hazardous wastes
- developing and implementing client requested health and safety programs
- developing a plan and procedure for compliance with DOT requirements for shipping and receiving hazardous materials.

Mr. Wilson's recent industrial hygiene and safety experience includes conducting health and safety audits at hazardous waste sites and in power generation facilities, foundries, and manufacturing complexes; evaluating air sampling data; training employees, and writing and/or reviewing health and safety plans for work on suspected or actual hazardous waste sites. Potential site hazards have included noise, confined spaces, welding, and other construction activities; and exposures to infectious biological agents, heavy metals, radioactive substances, and volatile organic and inorganic compounds as liquids or vapors. Clients have included Fortune 500 chemical, electronics, and manufacturing companies and small general contractors and land survey organizations. In addition, Mr. Wilson has supervised programs involving:

- workplace air monitoring
- health and safety training
- industrial hygiene data management
- facility audits
- indoor air quality evaluations
- ventilation systems evaluations
- industrial accident investigations
- asbestos exposure monitoring
- confined space entry training evaluations

Mr. Wilson also provides interpretations of occupational safety and health laws, regulations, and procedures. During chemical

emergencies, he develops procedures to ascertain occupational exposures and recommends an appropriate level of protection during implementation of emergency response plans. As Technical Associate for Safety and Health, he is responsible for providing expert guidance to in-house staff and to clients on the recognition and evaluation of potential exposures to chemical and physical hazards and the development of appropriate hazard control strategies. Mr. Wilson develops procedures to perform health and environmental hazard evaluations at industrial work sites and at hazardous waste sites, and writes the appropriate sampling and auditing procedures and health and safety guidance.

REPRESENTATIVE PROJECTS

Heavy Equipment Manufacturer - Air sampling for combustion products. Recommended control measures to reduce exposures.

Electronics Component Manufacturer - Air sampling for solvents and dust. Noise monitoring, confined spaces evaluations, and asbestos sampling and identification.

Electronic Components Manufacturer - Air sampling for cadmium during furnace brazing. Design consultation for emission controls on curing oven of electrostatic painting operation.

Electronic Components Manufacturer - Air sampling for isocyanates and methylene chloride during foam manufacturing.

Research Laboratory, HVAC Equipment Manufacturer - Wrote Ammonia Handling Safety Plan. Trained employees in hazard recognition and control.

Carbon Products Manufacturer - Health and safety compliance audit as an element of an environmental liability audit prior to purchase.

Electronics Components Manufacturer - Wrote health & safety plan meeting the requirements of 29 CFR 1910.120 for four hazardous waste sites containing polychlorinated biphenyls (PCBs).

Aircraft Engine Manufacturer - Performed health and safety program audit at facility.

Food Service Facility - Investigated suspected natural gas explosion to identify causes and potential for reoccurrence.

Warehouse Facility - Evaluated materials handling procedures, including loading and unloading facilities, for potential effects on indoor air quality.

Lighting Manufacturer - Evaluated materials handling procedures for potential employee exposure to chemicals used in bulb coatings.

Wastewater Treatment - Evaluated facility to identify potential safety and health hazards, including those related to chemical exposures, work procedures, materials handling, working surfaces, and stairs.

Defense Facility - Wrote health and safety plans meeting the requirements of 29 CFR 1910.120 for 10 remedial investigation activities.

Defense Facility - Wrote health and safety plans meeting the requirements of 29 CFR 1910.120 for 18 remedial investigation activities.

Defense Facility - Wrote health and safety plans meeting the requirements of 29 CFR 1910.120 for 8 remedial investigation activities.

Cogeneration Plant Operations - Conducted health and safety compliance audits in 8 operating plants.

Cogeneration Plant - Wrote health and safety plan meeting the requirements of 29 CFR 1910.120 for construction activities in soils impacted with PCBs.

Printing Facility - Supervised industrial air monitoring and data review.

Research Laboratory, Pharmaceutical Manufacturer - Developed hazard inventory system. Trained employees in use of labeling system. Conducted Hazard Communication Training.

Glass Manufacturer - Wrote health and safety plan meeting 29 CFR 1910.120 requirements for hazardous waste site operations and maintenance program.

Research Laboratory, HVAC Equipment Manufacturer - Wrote Laboratory Chemical Hygiene Plan. Trained employees in hazard recognition and control.

Contractor - Presented OSHA required 40-hour hazardous waste operations course for work crews and New York State employees prior to start of work on hazardous waste site containing PCBs.

Personal Products Manufacturer - Developed regulatory impact estimate for proposed facility design changes requiring the use of highly hazardous materials.

Chemical Manufacturer - Developed environmental basis for legal response to claims for reimbursement due to alleged mishandling of manufacturer's product (perchloroethylene).

Electronics Manufacturer - Wrote Hazard Communication Training Program. Trained supervisory trainers to present material.

Electronics Manufacturer - Evaluated newly installed process line to identify noise characteristics and provide basis for design of noise enclosure.

Electronics Manufacturer - Supervised health hazard evaluation of manufacturing facility.

Hospital - Evaluated ethylene oxide exposure of central material and supply employees.

Container Manufacturer - Evaluated plastics extrusion operation for exposure of operators to ammonia and tetrahydrofuran. Identified existing levels and recommended controls to reduce exposures.

School District - Evaluated air quality in classrooms to identify source and identity of particulate matter found on desks.

School District - Evaluated suspected potential sources of indoor air contaminants in school building bordering on closed landfill. Identified needs for further ground and air monitoring.

County Courthouse - Evaluated hearing room in response to indoor air quality. Provided findings on carbon dioxide, carbon monoxide, bacteria, fungi, and air movement. Recommended changes to air distribution system.

Aluminum Milling Facility - Health & Safety officer during removal of PCBs and oils from concrete within the facility. Trained contractor union employees to meet 29 CFR 1910.120 education requirements.

Aircraft Parts Manufacturer - Evaluated disposal site with potentially hazardous levels of waste radiological materials. Identified actual levels and locations and defined protective equipment for wear during site preparation and cleanup activities.

Conducts OSHA required initial, refresher and supervisor health and safety training courses for workers at hazardous waste sites.

Mr. Wilson's military experience includes:

Supervising industrial hygienists and technicians providing comprehensive industrial hygiene services (work site surveys, hazard sampling and employee training) to US Army industrial hygiene and

safety personnel at military installations and organizations in Germany, Italy, Turkey, Belgium, England, the Netherlands, Japan, and Korea.

Assisting military hospital and European area safety managers in industrial accident investigations.

Creating and evaluating industrial hygiene elements of occupational health programs throughout U.S. Army Europe and training technicians to use hazard evaluation equipment.

Evaluating the potential for asbestos exposure in work spaces during renovation of a military communications monitoring facility.

Evaluating exposures to gas and diesel engine combustion products during maintenance and issue of prepositioned military equipment.

Evaluating worker exposures to noise, wood dusts, and volatile solvents generated during resurfacing of gymnasium floors and bowling lanes.

Supervising instructors presenting training in industrial hygiene, sanitary engineering, air pollution, and food service sanitation to officers and enlisted US Army medical department soldiers during initial medical training.

Evaluating worker exposures to explosives and explosive precursors at US Army ammunition manufacturing facilities. Recommending corrective actions to minimize employee exposures and assisting in developing recommended standards for employee exposure.

Providing sanitary engineering and food service sanitation support to US Army forces in the southern half of the Republic of Viet Nam.

SPECIAL TRAINING

Health and Safety at Hazardous Waste Sites, 40 Hour Course, 1989
Supervisor of Hazardous Waste Operations Course, 1989 and Annually
Health and Safety at Hazardous Waste Sites Refresher Course, 1990 and Annually
New York State Asbestos Safety Training, Air Sampling Technician, 1992 and Annually
New York State Asbestos Safety Training, Building Inspector, 1992

PRESENTATIONS

"Industrial Hygiene and Safety Fundamentals for Certified Hazardous Materials Managers", Certified Hazardous Materials Manager Examination Preparation Course, Rochester, NY. August 1995.

"Indoor Air Quality Assurance Programs", Indoor Air Quality Seminar, Syracuse, NY.

"Industrial Hygiene Support for Installation Engineers", Deputy Chief of Staff for Engineering, U. S. Army, Europe, Heidelberg, FRG.

Two week courses in basic industrial health and safety topics for industrial hygiene technicians, 7th Medical Command, Heidelberg FRG.

"Industrial Hygiene for Safety Professionals", Deputy Chief of Staff for Personnel, U. S. Army, Europe, Heidelberg, FRG.

Health and Safety at Hazardous Waste Sites training courses (Initial, Refresher, Supervisor). 1989 to present.

PAPERS

"Training Workers for Hazardous Waste Sites", Pollution Engineering, Vol. 23, No.1 2, November 1991, pp. 80-84.

O'Brien & Gere Engineers, Inc.

Guy A. Swenson, III, CPG
Senior Technical Associate

PROJECT ASSIGNMENT

Geology & Mapping Technical Oversight

PROFESSIONAL PROFILE

Mr. Swenson provides technical direction to scientists and engineers in such areas as ground water evaluations, geophysical surveys, geologic mapping, and computer modeling of ground water flow and contaminant transport.

YEARS OF EXPERIENCE

With O'Brien & Gere: 16
With Other Firms: 1

EDUCATION

MS/1981/Geology
BA/1974/Geology

REGISTRATIONS

CPG, AIPG #7574

Registered Geologist, CA #RG5733; ID #800; OR #G1584; MO #RG579

Certified Hydrogeologist, CA #HG210

Registered Licensed Geologist, WY #PG-387

Registered Professional Geologist, TN-2451; KY #266

Professional Geologist, PA #PG-00411-G

Licensed Professional Geologist, IL #196-000187

TECHNICAL EXPERTISE

Mr. Swenson's capabilities include innovative and cost-effective solutions to technical problems, technical review and quality control review of projects and reports, ground water modeling, technical expert in litigation, negotiations with regulatory agencies, and developing and conducting training programs.

Mr. Swenson has also managed programs for major industrial firms in the electronics, automotive, chemical, and pharmaceutical industries, as well as for legal firms acting on behalf of clients. He has extensive experience with all phases of Remedial Investigation/Feasibility Studies, and with state and federal regulatory compliance issues. His capabilities include technical review, scheduling, budgeting, staff supervision, and coordination of projects with other divisions of the firm. In addition, he acts as liaison between clients and regulatory agencies, and develops and conducts ongoing, in-house training programs.

Mr. Swenson has been involved with these kinds of projects in diverse environments such as unconsolidated, glacial, fluvial, and marine deposits, as well as fractured bedrock and karst terrain.

As a professional hydrogeologist, Mr. Swenson is thoroughly familiar with hydrogeologic and chemical considerations in connection with hazardous waste management, water resources development, environmental assessments, and landfill siting.

REPRESENTATIVE PROJECTS

HAZARDOUS WASTE MANAGEMENT:

Mr. Swenson's hazardous waste management and project experience includes site investigations and assessment and remedial design for industrial waste facilities, contaminant bases and petroleum hydrocarbon bases. He has worked with both analytical and numerical computer modeling, and has supervised and performed:

- monitor well installations
- soil and ground water sampling
- aerial photograph interpretation
- geologic mapping
- aquifer performance tests
- test pit installations
- test borings
- hydrogeologic literature review
- geophysical surveys
- evaluation of direction and rate of ground water flow
- negotiations with regulatory agencies

Projects representative of his work with hazardous waste include:

New York, New Jersey, Massachusetts, Illinois, Michigan, Nebraska, and Wyoming - Responsible for developing work plan, conducting investigation, preparing report and evaluating remedial options for

RI/FS; remedial options included ground water pumping, vacuum extraction, soil removal, and no action.

New York, New Jersey, Indiana, Virginia, Vermont, Michigan, and Puerto Rico - Responsible for supervising and performing site investigations and hydrogeologic assessments of both active and closed municipal and industrial landfills. Also involved with the evaluation and design of ground water remediation systems at municipal and industrial landfills.

New York, New Jersey, Ohio, Indiana, and Maryland - Responsible for supervising and performing site investigations and hydrogeologic assessments of active and closed waste lagoons at industrial facilities. Also involved with the evaluation and design of ground water remediation lagoons.

New York, New Jersey, Virginia, Missouri, Illinois, Indiana, South Carolina, Ohio, Massachusetts, Maryland, Nebraska, Pennsylvania, California, Michigan, Puerto Rico, and India - Responsible for developing, supervising, and performing site investigations and hydrogeologic assessments of sites of organic and inorganic impact bases and disposal at both industrial and non-industrial facilities. Also involved in evaluating and designing soil and ground water remediation systems.

New Jersey and New York - Responsible for supervising and performing hydrogeologic evaluations and design of proposed passive in-place containment structures for municipal and industrial landfills.

New York, California, Maryland, Wyoming, Nebraska, Florida, New Jersey, and Massachusetts - Responsible for supervising and performing hydrogeologic evaluations and design of proposed and existing ground water control/recovery systems.

New York, New Jersey, California, Florida, Massachusetts, Illinois, Indiana, Michigan, Pennsylvania, Kentucky, Colorado, and Mexico - Conducted hydrogeologic evaluations and predictions for environmental assessments at industrial waste facilities and other properties.

TAR SITES:

Mr. Swenson's project and management experience includes site investigations, assessments, and remedial design evaluations for manufactured gas plant (MGP) sites and other industrial sites with tar residues. He has supervised and performed: monitor well installation, soil and ground water sampling, aerial photograph interpretation, geologic mapping, aquifer performance tests, test borings, hydrogeologic literature review, evaluations of direction and rate of ground water flow, evaluations of remedial design, and negotiations with regulatory agencies.

Woodbury, NJ - Senior hydrogeologist responsible for conducting a remedial investigation (RI) for a former MGP site which had been developed as a residential community. Project concerns included public relations, deep aquifer investigation, electric cone penetrometer, geophysical assessments (GPR, Magnetometer, EM), and surface water/sediment impacts. Responsible for planning, work plan development, and RI and remedial action (RA) components.

Medford, NJ - Senior hydrogeologist responsible for technical oversight during the implementation of an RI work plan at a former MGP site. Investigation activities included soil borings, test trenching, monitoring wells in both shallow and bedrock ground water, and off-site impact evaluation.

Trenton, NJ - Senior hydrogeologist responsible for technical oversight during work plan development, investigation, and remedial analyses for a former MGP site. Project concerns included impacts to off-site soils, ground water, and bedrock. Investigation methods included electronic core penetrometer testing, soil borings, test trenching, monitoring well installation, and bedrock cores.

New York - Senior hydrogeologist responsible for conducting an RI at a former tar disposal site. The investigations included test borings, monitoring well nest installation, ground water sampling, hydraulic conductivity testing, ground water sampling, surface water and sediment sampling, and three-dimensional ground water flow evaluation using ground water elevation and geochemical data. The project also included negotiations with the regulatory agency.

New Jersey - Conducted hydrogeologic investigations of tar impoundments at an industrial facility. The investigation activities included monitoring well installation, aquifer testing, ground water flow evaluations, and constituent assessment. Provided hydrogeological evaluations for the remedial design of tar impoundments at an industrial facility.

DENSE NON-AQUEOUS PHASE LIQUIDS (DNAPLS):

DNAPLs are being recognized as a unique environmental problem at many hazardous waste sites. Mr. Swenson has over ten years of experience investigating, remediating, and managing projects at sites which involve DNAPLs. He has supervised and performed: monitor well installation, soil and ground water sampling, aerial photograph interpretation, test pit installation, test borings, aquifer performance tests, geophysical surveys, evaluation of ground water flow, remedial design evaluations, and negotiations with regulatory agencies. Projects representative of his work with DNAPLs include:

New York, New Jersey, and Nebraska - Senior hydrogeologist responsible for conducting Remedial Investigations/Feasibility Studies at sites with DNAPLS.

New York, Maryland, New Jersey, Puerto Rico, Massachusetts, Michigan, Indiana, Nebraska, and Canada - Responsible for conducting and supervising hydrogeologic and constituent investigations at industrial facilities and former industrial disposal sites.

New York, Maryland, Indiana, New Jersey, Nebraska, and Canada - Responsible for evaluating the ground water remedial options and developing ground water remedial systems at sites where DNAPLs have impacted the ground water quality.

New York and North Carolina - Responsible for developing documentation to regulatory agencies demonstrating the presence of DNAPL. Also responsible for developing technical basis for Technical Impracticability case to regulatory agencies. This documentation included evaluations of time required for cleanup of sites with DNAPL and the effectiveness of DNAPL remedial technologies.

PETROLEUM HYDROCARBON LOSSES:

Mr. Swenson has extensive experience in site investigations, hydrogeologic assessments, and remedial design and implementation for petroleum hydrocarbon losses. He has supervised and performed these projects in California, Ohio, New Jersey, Colorado, Illinois, Iowa, Georgia, Missouri, Texas, Massachusetts, and New York. Programs have involved:

- geophysical surveys
- review of hydrogeologic literature
- monitoring wells
- soil and ground water sampling
- negotiations with regulatory agencies
- geologic mapping
- test borings
- test pits
- evaluations of the direction and rate of ground water and immiscible product flow
- hydrogeologic design and implementation of product recovery systems

ENVIRONMENTAL ASSESSMENT:

Mr. Swenson has supervised and performed hydrogeologic assessments including those involving pesticide application and New Jersey ECRA laws. These assessments include:

- review of hydrogeologic and soils literature
- test borings and monitor well installations
- soil and ground water sampling
- hydrogeologic evaluations of the test sites

Representative projects include:

Middlesex, Essex, Burlington, and Union Counties, NJ - Responsible for supervising and performing hydrogeologic environmental assessments (NJ ECRA) of industrial facilities.

Caroline and Dorchester Counties, MD - Responsible for supervising and performing an environmental assessment of pesticide applications.

Adirondacks, NY - Responsible for design and implementation of field study of pesticide and herbicide impact on ground water; involved installation of monitoring wells, in situ permeability tests, in situ tracer studies, and ground water and constituent transport modeling.

WATER RESOURCES/AQUIFER EVALUATIONS:

Mr. Swenson has evaluated ground water resources and aquifer hydraulics and designed and implemented ground water supply wells in various locations. These programs have involved:

- geophysical surveys
- aquifer performance tests
- geologic mapping
- literature research
- design of production wells
- ground water modeling
- well logging
- water chemistry
- meteorologic data
- remote sensed data
- exploratory drilling

Representative projects include:

Southern New York - Mr. Swenson was the senior hydrogeologist responsible for the design, installation and testing of a 1 MGD potable ground water supply for a private industry. The industry had two existing supply wells which did not provide sufficient water and suffered from inefficiencies. Through creative well design and installation techniques, an efficient supply well was brought on line for the industry which provides sufficient water for the site operations. The design, installation, and testing of the supply well was completed at a lower cost than initially projected.

New York, Delaware, Massachusetts, Pennsylvania, and Maryland - Evaluated ground water resources in unconsolidated deposits and bedrock for municipal water supplies and irrigation systems.

San Diego County, CA, and Mexico - Conducted an extensive study of a rural valley to provide a qualitative description of the ground water hydrology and geology.

New York, New Jersey, Indiana, Missouri, Michigan, and Maryland - Conducted aquifer performance tests to evaluate the production capabilities and hydraulics of aquifers.

New York, New Jersey, Michigan, Missouri, and Maryland - Evaluated aquifer hydraulics, ground water flow paths, and hydraulic influence of ground water pumping systems.

New London County, CT - Conducted a seismic refraction survey to delineate bedrock topography for a proposed dam overflow channel.

Onondaga County, NY - Provided technical consulting and field supervision for the installation of two 1300' salt brine wells for a local industry.

New York - Responsible for the completion of a ground water modeling project for a New York state town which operates a ground water infiltration trench adjacent to the Hudson River. The project was initiated because the water yield of the infiltration system was lower than expected. The specific objectives of this modeling study were to: identify the hydrogeologic conditions which were limiting the production capacity of the ground water infiltration system and assess the long term water yield which the system is capable of producing. The ground water model code MODFLOW was used. Following calibration, various hydrogeologic conditions were simulated in order to evaluate their potential impact on the system performance. The modeling effort indicated the siltation of the river bottom played a major role in reducing the performance of the infiltration trench. In addition, the limited thickness of the aquifer and the horizontal and vertical hydraulic conductivity of the aquifer acted to exacerbate the performance reduction caused by the silt. With river bottom siltation, the estimated system yield is 1000 gpm to 1500 gpm (1.4 mgd to 2.2 mgd) as compared to an estimated yield of 2500 gpm to 3000 gpm (3.6 mgd to 4.3 mgd) without siltation.

SOLID WASTE:

Mr. Swenson has designed, managed, and performed hydrogeologic evaluations of proposed landfill sites. He has implemented these programs in Seneca, Tompkins, Cayuga, Dutchess, Orange, and Orleans Counties in New York State. Programs have involved:

- surface geophysical surveys
- test borings
- geologic mapping
- literature research
- installation of ground water observation wells
- aquifer testing
- water chemistry
- remote sensed data

Data evaluation has included development of three dimensional ground water flow direction and rates, development of water budgets, and chemical characterization of aquifers.

LEGAL EXPERIENCE:

Confidential Client - Expert witness providing testimony, technical evaluations, consultation, affidavits, and deposition for defense in legal proceedings in the US District Court for Rhode Island. The case involved evaluations of constituent transport in ground water, time of travel of constituents, impact on municipal supply well field, source delineation of volatile organic compounds in an aquifer, DNAPL migration, and hydrogeology.

Major Metal Manufacturer, CA - Expert witness and hydrogeologic expert during arbitration hearings regarding impact of soil and ground water by petroleum hydrocarbons. The case involved four parties and required depositions and testimony before arbitration panel.

Attorney for Semiconductor Manufacturer, MD/Attorney for major Electrical Manufacturer, IN - Assisted attorneys in taking depositions from opposing experts.

Attorneys for Sand and Gravel Mining Operations, New York; for Consumer Products Manufacturer, New York; for Industrial Client, Wyoming; and for Municipal Water Purveyor, Alabama; - Expert witness providing technical evaluations, consultation, and affidavits regarding hydrogeology, soil and ground water impact, and constituent transport for legal proceedings.

GEOPHYSICAL SURVEYS:

Mr. Swenson's experience in surface and borehole geophysical surveys has been developed on projects which include hazardous waste sites, water resource evaluations, landfill siting, landfill remediation, and geotechnical evaluations. His experience in conducting and interpreting geophysical surveys includes: electrical resistivity, seismic refraction, magnetic, electromagnetics (terrain conductivity), ground penetrating radar, natural gamma, caliper, self potential, and borehole resistivity. Projects representative of his work with geophysical surveys include:

New York, Ohio, California, and Maryland - Conducted and interpreted electrical resistivity surveys to delineate subsurface lithology and depth to ground water.

New York, Connecticut, Pennsylvania, and Indiana - Conducted and interpreted seismic refraction surveys to delineate bedrock topography, subsurface lithology, and depth to ground water.

New York, New Jersey, California, Wyoming, and Maryland - Conducted, supervised, and interpreted magnetic surveys to locate buried ferrous objects and delineate the extent of buried waste material.

New York, Ohio, Indiana, Maryland, New Jersey, and Wyoming - Conducted, supervised, and interpreted electromagnetic surveys to locate buried ferrous objects, delineate the location of buried waste material, delineate constituent plumes, and evaluate horizontal changes in lithology.

New York, Indiana, and Maryland - Conducted, supervised, and interpreted borehole geophysical surveys to delineate subsurface lithology, fracture occurrence, and zones of ground water movement.

GROUND WATER MODELING:

Mr. Swenson has experience in the development and application of ground water models as well as the review of ground water modeling performed by others. His experience includes analytical, numerical, and stochastic modeling of ground water flow and constituent transport. Mr. Swenson's modeling experience has involved the evaluation of aquifers for ground water supply development, constituent transport, and remedial design at hazardous waste sites. Projects representative of his work with ground water modeling include:

Western Ohio - Completed stochastic constituent transport modeling of a trichloroethene plume which was migrating in a highly permeable aquifer. Only background information was available for evaluating off-site plume migration. The stochastic model facilitated an evaluation of potential plume concentrations and extent while considering the potential variability of off-site hydrogeologic characteristics. The modeling provided a basis for evaluating potential risks associated with plume migration beneath a flood plain and eventual discharge into a river.

Central New York - Responsible for performing three-dimensional ground water flow modeling in order to evaluate the effectiveness of multiple remedial scenarios. The site is located in an upland area composed of till overlying fractured bedrock. Volatile organic impact had been identified in the till and shallow bedrock. The Record Of Decision (ROD) for the site specified an upgradient ground water cutoff wall and a downgradient ground water collection trench for site remediation. MODFLOW and MODPATH ground water modeling codes were used to simulate existing site conditions and to evaluate various designs for the cutoff wall and collection trench. The ground water modeling facilitated the selection of the most cost-effective remedial design which met the performance requirements of the ROD.

Electrical Equipment Manufacturer, IN - Responsible for completing a stochastic solute transport modeling effort at a 20-acre landfill containing hazardous waste. The modeling effort was used to evaluate the potential off-site impact in bedrock ground water. The modeling results were used in litigation.

Natrona County, WY - As part of a CERCLA RI/FS conducted for a PRP group, Mr. Swenson was responsible for performing stochastic ground water transport modeling to evaluate potential concentrations and time duration of exposure for incorporation into the risk assessment. The combined modeling effort and risk assessment successfully demonstrated to the USEPA that off-site risks were acceptable and no active off-site remediation was necessary.

Baltimore, MD - Responsible for the development and execution of a three-dimensional ground water flow model used to evaluate the conceptual understanding of site ground water flow and to assist in the design of a site-wide ground water recovery system. MODFLOW and MODPATH were used to simulate the existing ground water flow system and constituent migration pathways. Once calibrated to site conditions, the model was used to assist in the design of the ground water recovery well locations and pumping rates. The modeling results were submitted to the USEPA to document the basis for the design of the ground water recovery system.

Tippicanoe County, IN - Performed analytical two-dimensional ground water flow modeling to evaluate capture zones for various recovery well scenarios. The remedial scenarios considered included different locations of recovery wells, the number of recovery wells, and pumping rates. The modeling also considered the hydraulic impacts of nearby municipal supply wells. Also completed stochastic solute transport modeling to evaluate the long term decline in ground water concentrations. The analytical and stochastic modeling results were used as a basis of design in the submittal to the state regulatory agency.

Western New York State - Performed three-dimensional numerical ground water flow modeling to simulate the installation of a low permeable cap, containment wall, and internal drain at a New York State listed hazardous waste site. The MODFLOW modeling effort provided an evaluation of the future ground water flow patterns and demonstrated that the containment wall, cap, and drain would result in inward ground water flow conditions.

Eastern Ohio - Responsible for performing two-dimensional ground water flow modeling in order to evaluate capture zones for a ground water recovery system installed in an alluvial valley. The analytical element method of modeling was used for modeling the valley and the site ground water flow and recovery systems. The objective of the modeling effort was to identify modifications necessary to control the ground water plume.

New York - Responsible for the completion of a ground water modeling project for a New York town which operates a ground water infiltration trench adjacent to the Hudson River. The project was initiated to identify the hydrogeologic conditions which were limiting the production capacity of the ground water infiltration system. The ground water

model code MODFLOW was used. The model was calibrated to production and site data. Following calibration, various hydrogeologic conditions were simulated in order to evaluate their potential impact on the system performance. The modeling effort identified that the siltation of the river bottom played a major role in reducing the performance of the infiltration trench. In addition, the limited thickness of the aquifer and the horizontal and vertical hydraulic conductivity of the aquifer acted to exacerbate the performance reduction caused by the silt.

WELLHEAD PROTECTION:

Dutchess County, New York - Responsible for conducting an evaluation of the potential for an existing landfill to impact a public supply well which tapped a shallow alluvial aquifer. Supervised the collection of hydrogeolgical data through geologic mapping, geophysical surveys, test borings, ground water elevation monitoring, stream flow measurements, and chemical characterization of ground water and surface water. These work efforts were combined with previously completed pumping tests to delineate the capture zone of the supply well and the area of potential ground water impact due to the landfill. It was assessed that the supply well was not directly capturing the ground water from the landfill. However, the ground water from the landfill was discharging to a stream uphill from the supply well, and the supply well was receiving a significant portion of its supply due to infiltration from the stream. Therefore, although the landfill had not directly impacted the supply well, the surface water provided the potential constituent transport mechanism from the landfill to the supply well.

Maryland - Responsible for evaluating whether a municipal ground water supply wellfield could potentially capture impacted ground water from a heavily industrialized area across a small bay. The supply wells were installed in a regional aquifer which had multiple users. Developed a numerical ground water flow model based upon the available published data on the aquifer and documented pumping rates of the various aquifer users. This model considered the regional ground water flow patterns as well as the hydraulic impacts due to the numerous active wells. The results of the modeling indicated that the contaminated ground water in the industrialized area could migrate to the municipal supply.

Indiana - Responsible for completing ground water flow and constituent transport modeling to evaluate the potential impact of a volatile organic plume on a municipal well field. O'Brien & Gere's client had a ground water plume on their site and was concerned that the plume had moved off the site and could impact a municipal well field. Mr. Swenson supervised the development of a ground water flow model and constituent transport model to examine the possible fate of the volatile organic plume. This evaluation considered the alluvial aquifer characteristics, the presence of a nearby river, and the pumping schedule of the municipal well field in developing the models. The results of the modeling suggested the well

field could be impacted, and the client subsequently sampled the municipal supply.

Ohio - A ground water plume potentially threatened a municipal ground water supply well located in an alluvial valley. Mr. Swenson supervised the evaluation of the capture zone of the municipal well and the potential migration of the plume. When it became evident that the plume would migrate to the supply well, O'Brien & Gere participated in the design and installation of a ground water recovery wells system which would intercept the plume and prevent it from impacting the supply well. To complete this project, Mr. Swenson used available hydrogeologic information, localized aquifer test data, boring logs, and ground water elevation measurements to delineate the aquifer conditions. He supervised the development of an analytical ground water flow model to simulate the regional aquifer system and evaluate the capture zones of the supply well and the recovery well system.

Rhode Island - Served as an expert witness for a legal case in which volatile organic constituents allegedly migrated from a site, under a river, and to a municipal supply wellfield. The site was located in an alluvial valley. A central question of the case was the travel time of the constituents from the source to the wellfield. Mr. Swenson evaluated the ground water flow paths of the constituents and the capture zone of the municipal supply well field in order to provide an expert opinion on the constituent travel time from the source to the well field.

PROFESSIONAL AFFILIATIONS

National Ground Water Association
Geological Society of America
American Institute of Professional Geologists

PUBLICATIONS

Evaluation of Patapsco Aquifer Hydraulics by Tidal Fluctuation Responses. Bogardus, Peter, Swenson, Guy, and Mickam, James. Proceedings of Groundwater Issues and Solutions in the Potomac River Basin/Chesapeake Bay Region. March 1989.

Ground Water Models: Tracking Contaminant Migration. In Hazardous Waste Site Remediation - The Engineer's Perspective. Ed. O'Brien & Gere Engineers, Inc. Van Nostrand Reinhold Co. (New York, 1988).

Design and Evaluation of In-Place Containment Structures Utilizing Ground Water Cutoff Walls; Lynch, Edward R., Anagnost, Stephen W., Swenson, Guy A., and Lee, George W; Proceedings of the Fourth National Symposium and Exposition on Aquifer Restoration and Groundwater Monitoring; May 1984.

Post Construction Ground Water Hydraulics at Loeffel Site at Southern Rensselaer County, NY; Lee, George W., Bhatia, S.K., Swenson, Guy A., III, Clemence, S.P.; International Symposium on Case Histories in Geotechnical Engineering, April 1984.

Evaluations of Ground Water Hydraulics with Respect to Remedial Design, Blasland, Warren V., Jr., Lee, George W., Jr., Swenson, Guy A., III 4th National Conference on Management of Uncontrolled Hazardous Waste Sites, October 1983.

Upper Cretaceous Deep-Sea Fan Deposits, San Diego co-author; in Geological Excursions in The Southern California Area, Geological Society of America, 1979.

O'Brien & Gere Engineers, Inc.

Ronald A. Crowson, PhD, PG
Managing Scientist

PROJECT ASSIGNMENT

Geophysics Technical Oversight

PROFESSIONAL PROFILE

Mr. Crowson provides expertise in the following: environmental geology, ground water hydrology, economic geology, geophysics, light stable isotopes of surface and ground water, carbonates, phosphates, and silicates, geochemistry, mine geology, heavy mineral deposits, phosphate geology, coal geology, sedimentation and stratigraphy, marine geology, and organic geochemistry.

YEARS OF EXPERIENCE

With O'Brien & Gere: 5.5
With Other Firms: 21

EDUCATION

PhD/1995/Marine, Earth and Atmospheric Sciences

MS/1980/Geology
BSP/1972/Geolgoy

REGISTRATIONS

Licensed Geologist - NC
Professional Geologist - FL

REPRESENTATIVE PROJECTS

Related Experience at O'Brien & Gere Engineers

As manager of O'Brien & Gere's Raleigh Office, Dr. Crowson has been responsible for the development and management of a broad range of programs in North and South Carolina.

At Stanley Tools in Cheraw, SC, O'Brien & Gere completed a comprehensive site assessment (CSA) and corrective action plan (CAP). These activities resulted in the first approved natural attenuation CAP at a RCRA facility in SC. Additionally, O'Brien & Gere is pursuing the first *in situ* treatment of chromium-affected ground water and soil in USEPA Region IV. This program involves the use of innovative technologies developed in O'Brien & Gere's Raleigh Office.

O'Brien & Gere is currently managing the Carolawn Superfund Site in Ft. Lawn, SC. Here, chlorinated solvents were improperly disposed of and subsequently required ground water remediation. This project is similar in size with the current AVX plume. O'Brien & Gere is currently maintaining and operating a ground water pumping and treatment system. Eventually, O'Brien & Gere will move to shut the system down as the ground water concentrations reach asymtotic levels.

Dr. Crowson was involved in the implementation of two RODs at Camp Lejeune Marine Base situated on the coastal plain of NC. The geologic setting here is similar to the sandy coastal plain sequences found at the AVX site. O'Brien & Gere constructed two pumping and treatment systems capable of treating 80 gpm each. Dr. Crowson worked the state and USEPA Region IV environmental personnel to assure that the system performed in accordance with the approved ROD.

Experience prior to O'Brien & Gere Engineers

Managed all activities related to engineering, storm water management, watershed modeling, and ground water for a geological engineering firm. Negotiated site remediation with concerned state and federal agencies. Accomplishments include the completion of the storm water management study for the City of Raleigh's Bushy Branch drainage basin, completion of 32 Superfund LUST projects funded by state and federal agencies involving tank closure and rehabilitation studies of underground storage tanks (USTs) and leaking UST (LUST) sites; completion of geologic and geophysical site assessment at a low-level radioactive waste repository; completion of a Wellhead Protection and Management Program and establishment of a fuel recovery program for Camp Lejeune Marine Base, NC; conducted DNAPL site assessment and cleanup at four DOT asphalt plant sites; and establishment of a minerals R&D program in collaboration with Virginia Polytechnic Institute, Blacksburg, VA.

Minerals Management Service, through East Carolina University - Contracted to compile a minerals data base for Onslow Bay, NC. This project has resulted in two publications, with two more publications in progress.

U.S. Borax, Raleigh, NC - Contracted to evaluate the status of the world phosphate industry and project potential of market entry.

Farmpak, Inc., Nashville, NC - Completed an economic evaluation of several large heavy mineral deposits in eastern North Carolina.

Development Planning & Research Associates, Inc., Manhattan, Kansas - Contracted to evaluate phosphate resources and mining techniques in order to complete an economic feasibility study for mining phosphatic sands in Onslow Bay, NC.

US Army Corps of Engineers, Vicksburg, MS - Project Director for a large coastal research project entitled "SUPERDUCK". The project involved more than 125 scientists from US and six foreign nations. This project has resulted in numerous publications and paper presentations concerning beach erosion.

Project Geologist, N.C. Phosphate Corp., Aurora, NC - Managed the acquisition and synthesis of geologic information needed to plan a 4 million tons per year phosphate mine in Aurora, NC. Accomplishments include design of a 35 million gallon per day ground water de-pressurization system, a geologic evaluation of a land trade involving 35,000 acres of prime phosphate lands, and the design, installation, and operation of approximately six thousand feet of wellpoint dewatering system. Produced portions of field guide books for the International Geologic Correlation Program (IGCP) 156, and the Society of Economic Paleontologist and Mineralogist.

Agrico Mining, Tulsa, OK - Served as a special project geologist. Accomplishments include completing a geologic evaluation of the Sri Lanka phosphatic carbonatite deposit at Eppawala, Sri Lanka. Developed a potash exploration program in Thailand based on prior exploratory drilling completed by the Thailand Geological Survey. Project geologist assigned to a joint venture project between International Minerals and Chemical and Agrico to conduct pilot scale borehole mining of Agrico's deep phosphate deposits near Jacksonville, FL. The project included the design, construction and testing of a successful borehole mining system on unconsolidated phosphatic sands approximately 250 feet beneath the surface.

PCS PhosphateTexasgulf, Inc., Aurora, NC - Assigned to Long Range Planning and Mine Production. Accomplishments include a geologic evaluation of mineral resources (including phosphorate and heavy minerals) on a 16,000-acre property in Pamlico County; a resource evaluation of a 10,000-acre lease property located on the Pamlico River

Estuary, and an evaluation of geologic hazards in the Texasgulf mine area. Responsible for the management of the TGI 70 million gallons per day ground water production plan and the monitoring of all NPDES discharge points associated with the mine and waste disposal sites. Managed all of TGI's ground water monitoring wells and prepared annual reports on the condition of the impacted aquifer systems.

International Minerals and Chemical Corp., Lexington, KY - Assigned to the Coal Division as Chief Geologist in charge of all geologic programs. Accomplishments include completion of approximately twenty due diligence studies on coal properties located from Alabama to Pennsylvania in consideration for purchase. Assigned to two operating coal companies and placed in charge of the division's environmental monitoring, permit application, and resource management.

Also assigned to IMC's Exploration Division involving exploration geology in Quebec, Ontario, and Manitoba, Canada on alkalis Carbonatite Complexes, including the Cargill Complex near Kapuskasing, Ontario. Assisted on the initial exploratory drilling on the Cassidy Lake potash deposit in New Brunswick. Conducted uranium exploration in the Basin and Range Province of Nevada.

ACADEMIC AFFILIATIONS

Lecturer for North Carolina State University, Raleigh: Taught Physical Geology and Economic Geology.

Research Assistant, East Carolina University, Greenville, NC - Managed the Roanoke Island Research Project, sponsored by NC Sea Grant. Accomplishments include coordinated land and field work on a major Holocene sedimentation and stratigraphy project located on North Carolina's Outer Banks, including the operation of a heavy mineral separation laboratory at East Carolina University.

The University of Texas, Austin - Teaching Assistant for undergraduate students. Accomplishments include taught three physical geology laboratory classes while enrolled at UT.

Research Assistant, East Carolina University, Greenville, NC - Managed lab and field operations. Accomplishments include assisted in the collection and compilation of geologic data from the Roanoke Island areas, NC. Work involved the use of standard SCUBA diving techniques and sediment laboratory procedures to characterize modern and relict sands collected in the sounds surrounding Roanoke Island.

PROFESSIONAL AFFILIATIONS

Association of Ground Water Scientist & Engineers
American Consulting Engineers Council (National Environmental Committee)

Geological Society of America
North Carolina Ground Water Professionals Association
Carolina Geological Society
American Institute of Mining Engineers

PROFESSIONAL RECOGNITION AND COMMUNITY SERVICE

Dr. Crowson is currently serving of the American Consulting Engineers Council's National Committee for Environmental Issues.

Guest Speaker at the 10th Annual Southeastern Meeting of the American Institute of Mining Engineers, in Lakeland, FL., 1995 The topic of my lecture was, "The Application of Geophysical Tools as a Cost Saving Measure in the Phosphate Mining Industry."

Conducting collaborative research with Drs. Peter Stille and Norbert Clauer of Centre National de le Recherche Scientifique (CNRS), Center de Geochemie de la Surface, Universitie de Louis Pasteur, Strasbourg, France.

Participant in the International Geologic Correlations Program (IGCP-156) in Oxford, England.

Guest Speaker at the 8th Annual Southeastern Meeting of the American Institute of Mining Engineers, in Lakeland, FL. The topic of my lecture was, "The Economic Feasibility of Mining Phosphate in Onslow Bay, NC."

Appointed by the Governor of North Carolina to serve as a member of the first board for licensing of geologists. Served for three years as the inaugural chairman of the board.

Guest Speaker at the Carolina's Section, American Institute of Mining Engineers in Washington, NC. The title of my presentation was, "The Phosphate Mineral Resources in Onslow Bay, North Carolina."

Participant in the International Geologic Correlation Program, Eighth International Field Trip and Symposium, Southeastern US.

Participant in the International Geologic Correlation Program entitled, "Caribbean Phosphorites."

Aided in the construction of several multimedia film and course guides designed for junior high earth science classes in North Carolina.

Appointed by the Governor of North Carolina to serve on a Technical Advisory Committee for the compilation of a geologic atlas covering a four county area in northeastern North Carolina.

Expedition member on five offshore cruises along the Atlantic Continental Margin. The major focus of these NSF sponsored projects was to determine the nature of the geology of the bottom and near bottom sediments.

Appointed to the Board of Directors for the Aurora Fossil Museum, Aurora, NC.

Won recognition by the Sigma Xi Scientific Society at East Carolina University for outstanding undergraduate research.

Selected as student representative for the East Carolina University Steering Committee. Served as a member of the panel to develop a self-evaluation program at ECU.

PUBLICATIONS

Geology of Onslow Bay, North Carolina - This is an approved publication to be published as a North Carolina Geological Survey Bulletin, 1995, R.A. Crowson, S.R. Riggs, S.W. Snyder.

High Resolution Seismic Stratigraphy Along the Eastern Atlantic Margin - This is a proposed AAPG Special Atlas. The US Minerals Management Service has graciously provided funding for the construction of this Atlas. R.A. Crowson, S.R. Riggs, S.W. Snyder, A.C. Hine.

North Carolina Continental Shelf (Part 1) - Sedimentation through one Miocene depositional cycle based on Sr and Nd isotopic analysis of phosphorate peloid. R.A. Crowson, S.R. Riggs, S.W. Snyder, P. Stille, N. Clauer, D. Ames.

North Carolina Capacity Use Areas, Fact of Fiction - In North Carolina Groundwater Professionals Newsletter, 1991, R.A. Crowson.

Preparation of Phosphate Samples for Oxygen Isotope analysis, Analytical Chemistry, V. 63, p. 2397-2400, 1991, R.A. Crowson, W.J. Showers, E.K. Wright, T.C. Hoering.

High-Resolution Isotopic Stratigraphy from the Miocene Section, Onslow Bay, NC (abst.) NE/SE Regional Meeting, Geol. Soc. Amer., 1991, R.A. Crowson, W.J. Showers, S.R. Riggs.

Relationship of Phosphate geochemistry to cyclic continental margin deposition during the Upper Cenozoic: Onslow Bay, NC (abst.) NE/SE Regional Meeting, GEol. Soc. Amer., 1991.

Geochemical Variability of Phosphate Grains from Onslow Bay, NC (abst.), NE/SE Regional Meeting, Geol. Soc. Amer., 1991, R.A. Crowson, D.V, S.R. Riggs, W.J. Showers.

Oxygen isotope geochemistry of Miocene phosphate grains from Onslow Bay, NC: Evidence of Miocene western boundary current induced upwelling (abst.), Geol. Soc. Amer., Abstracts from Program V 22, No. 7, p. 344-355, 1990, R.A. Crowson, W.J. Showers, S.R. Riggs.

Chemical Characteristics and re-evaluation of the phosphate resource potential in Onslow Bay, NC Continental Shelf, Marine Mining, V. 9, p. 1-41, 1990, R.A. Crowson, E.R. Powers, S.R. Riggs, Snyder, W. Snyder, W. Stephen.

Superduck Nearshore Process Experiment: Summary of Studies, C.E.R.C., Research Facility Circular 88-12, U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS, 1989, R.A. Crowson, W.M. Berkemier, H.M. Kleine, H.C. Miller.

Stable Isotopes and cyclic deposition in the Miocene Pungo River Formation North Carolina continental margin, Marine Geochemistry Volume of Abstracts for the 1987 Gordon Conference on Geochemistry, 1987, R.A. Crowson, W.J. Showers, S.R. Riggs.

Superduck Preliminary Report: A Log of Activities for the Fall of 1986. Nearshore Processes Experiment at Duck, NC, U.S. Army Corps of Engineers, Waterways Experiment Station, Coastal Engineers Research Center, Vicksburg, MS. 313, p. 1987, R.A. Crowson.

Geology of the Aurora Phosphate District: in Patterns of cyclic sedimentation of the upper Cenozoic section, NC Coastal Plain, Eds., S.R. Riggs and W.S. Snyder: SEPM Guidebook, Field Trip No. 13, Soc. Econ. Paleon. and Min., Tulsa, OK, p. 11-23, 1986, R.A. Crowson, S.W. Snyder, S.R. Riggs, P.M. Mallette.

Place Names of the Outer Banks, Thomas A. Williams Press, Greenville, NC, 1985, R.A. Crowson, R.L. Payne.

Relationship of Stratigraphy to overburden dewatering at the South Creek Phosphate Mine, Aurora, NC, Proceed. of the AIME Meetings, p. 53, 1983, R.A. Crowson, S.R. Riggs.

Nearshore rock exposures and their relationship to modern shelf sedimentation, Onslow Bay, NC, Masters thesis, East Carolina University, Greenville, NC, 1980, R.A. Crowson.

Nearshore rock exposures in Onslow Bay, Onslow County, NC (abst.), Jour. Elisha Mitchell Sci. Soc. V. 90, No. 4, 1976, R.A. Crowson, S.R. Riggs.

"Tar River" in the Bicentennial Book, edited by Thomas A. Williams, ERA Press, Greenville, NC, 1974, R.A. Crowson.

Geology of the northern end of Roanoke Island (abst.), Jour. Elisha Mitchell Sci. Soc., V. 87, No. 4, 1971, R.A. Crowson.

A study of the post-Castle Hayne deposits along the New River, Onslow County, NC (abst.), Jour. Elisha Mitchell, Sci. Soc., V. 86, No. 4, 1970, R.A. Crowson.

O'Brien & Gere Engineers, Inc.

Shawna M. O'Neil
Senior Project Scientist

PROJECT ASSIGNMENT

Database and Reporting Technical Oversight

PROFESSIONAL PROFILE

Ms. O'Neil currently serves as the Group Leader for the GIS/Data Management Group.

YEARS OF EXPERIENCE

With O'Brien & Gere: 7
With Other Firms: 0

EDUCATION

MS/in progress/Engineering Management

BA/1992/Chemistry

TECHNICAL EXPERTISE

- Information management
- Field and laboratory quality assurance/quality control (QA/QC) procedures
- Project QA/QC oversight
- Preparing Quality Assurance Project Plans (QAPPs)
- Performing data validations, interpretation and useability assessments to qualify analytical sample results

REPRESENTATIVE PROJECTS

INFORMATION MANAGEMENT:

Monsanto; Anniston, AL - Coordinated GIS and data management activities associated with environmental investigation of chemical manufacturing plant and surrounding surface water bodies.

Solutia-Queeny; St. Louis, MO - Coordinated GIS and data management activities associated with a chemical manufacturing plant.

Columbia Manufacturing, MA - Coordinated GIS and data management activities associated with environmental investigation of manufacturing facility.

Dunham-Bush/Hartford Compressor Site; Hartford, CT - Coordinated GIS and data management activities associated with environmental investigation of manufacturing facility.

DOW Chemical Corporation, WY - Coordinated GIS and data management activities associated with litigation support activities.

U. S. Air Force, Columbus Air Force Base, OH - Served on the data management yeam for the management and integration of field and analytical data for Stage 2A field activities.

U. S. Air Force, 45th Space Wing, Cape Canaveral Air Station and Patrick Air Force Base, FL - Served on the data management team for the management and integration of field and analytical data for the 27 remedial investigations.

U. S. Air Force, Newark Air Force Base, OH - Designed and implemented a data management system for a site investigation.

U. S. Air Force, 45th Space Wing, Cape Canaveral Air Station, FL - Designed and implemented a GIS/data management system for management and integration of field and analytical data for 31 site investigations.

U. S. Air Force, Eglin Air Force Base, FL - Designed and implemented a GIS/data management system for management and integration of field and analytical data for 15 RCRA facility investigations.

General Motors Corporation; Windiate Park, MI - Designed and implemented a data management system for management and integration of analytical data for a remedial investigation.

TRW, Inc.; Sterling Heights, MI - Designed and implemented a data management system for management and integration of analytical data for a remedial investigation.

GEPT, Bank of New York; Middletown, NY - Designed and implemented a data management system for management and integration of analytical data for a site investigation.

U. S. Air Force, Westover Air Force Base, MA - Utilized predeveloped USAF data management systems to provide Informal Technical Information Reports (ITIRs) to the USAF.

Barkhamsted/New Hartford Landfill Superfund Site; Barkhamsted, CT - Designed and implemented a data management system which incorporated analytical historical data with current ongoing monitoring data.

Stanley Tools; Worcester, MA - Designed and implemented a data management system for management and integration of analytical data for a comprehensive site assessment.

U. S. Air Force, Youngstown Air Force Base, OH - Designed and implemented a data management system which incorporated analytical historical data with current data.

American Home Products Corporation; Bound Brook, NJ - Designed and implemented a comprehensive data management system which incorporated field and analytical data in a relational database and produced custom queried report quality reports.

GEPT, Bank of New York; Middletown, NY - Designed and implemented a data management system for management and integration of analytical data for a site investigation.

QUALITY ASSURANCE PROGRAM DEVELOPMENT AND OVERSIGHT:

U. S. Air Force, 45th Space Wing, Cape Canaveral Air Station and Patrick Air Force Base, FL - Served as Quality Assurance Officer for a Phase II, Stage 3, RI/FS. The project involved the investigation of 27 sites of concern for various constituents.

U. S. Air Force, 45th Space Wing, Cape Canaveral Air Station, FL - Served as Quality Assurance Officer for 31 site investigations.

U. S. Air Force, Eglin Air Force Base, FL - Served as Quality Assurance Officer for 15 RCRA facility investigations.

U. S. Air Force, Cape Canaveral Air Station, FL - Served as Quality Assurance Officer for a base-wide ecological risk assessment program.

U. S. Air Force, 45th Space Wing, Cape Canaveral Air Station, FL - Served as Quality Assurance Officer for 4 remedial investigations.

QUALITY ASSURANCE PROJECT PLANS (QAPPs):

Thaler & Thaler/Hinman, Howard, & Kattell, Weitsman Property; Owego, NY - Developed a QAPP to present specific QA/QC criteria for work efforts associated with a NYSDEC Phase II field investigation.

City of Utica, Bossert Site, NY - Developed a QAPP to present specific QA/QC criteria for work efforts associated with a NYSDEC remedial action.

First Piedmont Rock Quarry Group, First Piedmont Rock Quarry; Danville, VA - National Priority List, USEPA Superfund Site - Developed a QAPP to present specific QA/QC criteria for work efforts associated with a remedial design.

Zeidrich Dump Site; Minerva, OH - Developed a QAPP to present specific QA/QC criteria for work efforts associated with an Ohio EPA (OEPA) Remedial Investigation/Feasibility Study (RI/FS).

TRW, Inc., Former Ramsey Site; Sullivan, MO - Developed a Data Collection Quality Assurance Plan (DCQAP) to present specific QA/QC criteria for work efforts associated with USEPA Interim Remedial Measures (IRMs).

U. S. Air Force, 45th Space Wing, Cape Canaveral Air Station, FL - Developed a QAPP to present specific QA/QC criteria for work efforts associated with site investigations under the USAF Installation Restoration Program (IRP).

Confidential, Bakers Falls Site; Fort Edward, NY - USEPA National Priority List, Superfund Site - Developed a QAPP to present specific QA/QC criteria for work efforts associated with a NYSDEC RI/FS.

U. S. Air Force, Eglin Air Force Base, FL - Developed a QAPP to present specific QA/QC criteria for work efforts associated with RCRA Facility Investigations (RFIs) under the USAF IRP.

Inland Fisher Guide Division of General Motors Corporation; Flint, MI -Developed a QAPP to present specific QA/QC criteria for work efforts associated with a delisting petition.

DATA VALIDATION AND REVIEW:

U. S. Air Force, Columbus Air Force Base, OH -Prepared a data validation/data usability report for polychlorinated biphenyl (PCB)/ pesticide data collected in connection with a Stage 2A Investigation under the USAF IRP.

Barkhamsted Sanitary Landfill; Barkhamsted, CT - National Priority List, Superfund Site - Prepared a data validation/data usability report for inorganic data collected in connection with a RI/FS.

TRW, Inc., Former Ramsey Site; Sullivan, MO - Prepared a data validation/data usability report for PCB/pesticide data collected in connection with IRMs.

U. S. Air Force, 45th Space Wing, Cape Canaveral Air Station and Patrick Air Force Base, FL - Prepared a data validation/data usability report for data collected in connection with a Stage 3 RI/FS under the USAF IRP.

LITIGATION SUPPORT:

DOW Chemical Corporation, WY - Coordinated GIS and data management activities associated with litigation support activities.

SPECIAL TRAINING

Hazardous Waste Operations Training - 40 Hour OSHA Certification

United States Air Force (USAF) Installation Restoration Program Information Management System (IRPIMS) Training

PROFESSIONAL AFFILIATIONS

American Chemical Society - Environmental Chemistry Section

PUBLICATIONS and PRESENTATIONS

Kara L. Ford, Shawna M. O'Neil, Neil E. Kaufman, *Remedial Investigation Information Management: Integrating IRPIMS Electronic Deliverables with Environmental GIS Applications*, Presented at the 1994 HMCRI Federal Environmental Restoration III Conference and Exhibition, New Orleans, LA.

Shawna M. O'Neil, *QA/QC Procedures and Applications for USAF Contract Required Laboratory Deliverables*, Presented at the 1994 AFCEE Analytical Services Technical Symposium, San Antonio, TX.

Neil E. Kaufman, Shawna M. O'Neil, Christopher T. Aliberto, *Quality In, Quality Out, A Standardized Approach to Data Management*, Presented at the 1995 HMCRI Conference, Atlanta, GA.

Shawna M. O'Neil, *Integrating Client and Contractor Data Management Systems: IRPIMS and GIS, a Case Study*, Presented at the 1995 American Defense Preparedness Association (ADPA) Conference, San Diego, California.

Shawna M. O'Neil, *Environmental Data Management in the Multimedia Regulatory Age*, Presented at the 1995 Academy of Certified Hazardous Materials Managers Conference on Environmental Management in the Multimedia Regulatory Age, Rochester, NY.

Shawna M. O'Neil, *Integrating Client and Contractor Data Management Systems: IRPIMS and GIS, a Case Study*, Presented in the DOE Environmental Restoration Data Systems Workshop at the 1995 Environmental Restoration (ER '95) Conference, Denver, CO.

O'Brien & Gere Engineers, Inc.

Karen A. Storne
Project Scientist

PROJECT ASSIGNMENT

Quality Assurance Technical Oversight

PROFESSIONAL PROFILE

Ms. Storne has twelve years of experience working in the environmental and industrial hygiene field. Her current responsibilities include data validation, laboratory audits, quality assurance/quality control oversight, and preparation of quality plans. Her responsibilities have included the operation of the following instruments: gas chromatograph/mass spectrometers, volatile and semivolatile organic gas chromatographs, fourier transform infrared spectrophotometers, high pressure liquid chromatographs, and atomic absorption spectrometers. Her analytical chemistry experience also includes various sample preparations, wet chemistry techniques, and data generation and interpretation.

YEARS OF EXPERIENCE

With O'Brien & Gere: 6
With Other Firms: 6

EDUCATION

BS/1987/Chemistry

AAS/1979/Respiratory Therapy

AS/1976/Science

TECHNICAL EXPERTISE

- Data validation and interpretation and usability assessments to qualify analytical sample results according to various state agency and USEPA Contract Laboratory Program (CLP) guidelines.
- Working knowledge of USEPA analytical methods including SW-846, CLP, water and wastes, and New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocol (ASP).
- Quality assurance and quality control oversight for field and laboratory procedures.
- Preparation of Quality Assurance Project Plans (QAPPs) and Sampling and Analysis Plans (SAPs).
- Conduct laboratory audits.
- Technical coordinator for analytical data validation and chemical quality assurance/quality control (QA/QC..

REPRESENTATIVE PROJECTS

DATA VALIDATION:

AlliedSignal, Hudson County Site - Performed data validation reports for over 2,300 hexachromium analyses along with total chromium, TCL organics, and total petroleum hydrocarbone (TPH) analyses in accordance with NJDEPE requirements.

Electronics Manufacturer - Prepared a series of data validation/data usability reports for volatile organic and polychlorinated biphenyls (PCB) data collected in connection with the private well sampling and public water connection, as well as remedial investigation programs. Validation was performed in accordance with USEPA Region II guidelines.

W.R. Grace - Performed data validation for 60 water samples analyzed by USEPA Method 601/602 and 8010/8020. The validation report was prepared in accordance with USEPA Region III guidelines.

TRW, Inc. - Performed the data validation and prepared several data validation/data usability reports for data collected in connection with a description of current conditions report for a former TRW site .

Electronics Manufacturer - Performed data validation in accordance with NYSDEC protocol for surface water samples, and prepared a data validation/data usability report.

Electronics Manufacturer - Performed data validation and prepared a data validation/data usability report for soil samples analyzed for polychlorinated dibenzofurans (PCDFs) and PCBs using USEPA SW-846 Methods 8290 and 8081, respectively, in accordance with National Functional Guidelines.

Railcar Manufacturer - Prepared data validation/data usability report for the analysis of over 350 samples for PCBs, in accordance of USEPA National Functional Guidelines.

U.S. Air Force, Patrick AFB and Cape Canaveral Air Force Station - Performed data validation for over 1000 analyses including soil, sediment, water, and biota samples analyzed for volatiles, semivolatiles, pesticides, PCBs, metals, total organic compounds (TOCs), and explosive residues performed under Air Force Center for Environmental Excellence (AFCEE) protocol. Data validation/usability reports were prepared and QA/QC laboratory oversight was performed.

U.S. Air Force, Eglin AFB - Prepared data validation/usability report for the analyses of 200 samples analyzed for volatiles, semivolatiles, pesticides, PCBs, metals, TOCs, and explosive residues in accordance with AFCEE protocol.

U.S. Air Force, Youngstown AFB - Performed data validation and prepared a validation report for 30 samples in connection with the U.S. Air Force Installation Restoration Program.

Electronics Manufacturer - Prepared a data validation/usability report for an Ohio site for water samples analyzed for volatiles, semivolatiles, PCBs, TPHs, metals, and cyanide using National Functional Guidelines.

General Motors - Performed data validation for 250 samples including soil, sediment, and water in accordance with USEPA National Functional Guidelines.

Dorney Road Landfill Site - Performed data validation for water samples analyzed for USEPA Method 524.2 in accordance with USEPA Region III guidelines.

Gibbs & Hill - Performed data validation of full CLP documentation from H_2M Labs, Inc. in support of a Phase 2 hazardous waste investigation. Included 35 potential hazardous waste sites, generating over 350 samples.

Wehran-New York, Inc., NYSDEC GFIM Landfill Site - Performed data validation of gas chromatograph/mass spectrometry (GC/MS) volatile and semivolatile data packages from analyses performed by York Laboratories.

AlliedSignal, Willis Avenue Site - Performed data validation for samples analyzed by volatiles, semivolatiles, pesticides, PCBs, metals, and cyanide using NYSDEC ASP methods and USEPA methods.

QUALITY ASSURANCE/QUALITY CONTROL:

AlliedSignal, Hudson County Site - Conducted laboratory audit at the Envirotech Research, Inc. laboratory which performed over 2,300 hexachromium and total chromium analyses and over 220 TCL organic (volatiles, semivolatiles, PCBs), TAL metals, and TPH analyses using USEPA and NJDEPE methods.

Electronics Manufacturer - Prepared a QAPP for the analysis of soil samples by USEPA SW846 Methods 8290 (dioxins) and 8081 (PCBs).

Niagara Mohawk - Prepared a QAPP in accordance with NYSDEC RCRA and USEPA guidance for the analysis of volatiles, semivolatiles, and PCBs in ground water, surface soil, subsurface soil, and surface water samples.

U.S. Air Force - Prepared a data validation standards operating procedure for the validation of over 2000 environmental samples analyzed for volatiles, semivolatiles, pesticides, PCBs, metals, TOCs, and explosive residues in connection with U.S. Air Force Installation Restoration Program projects.

Participated in a laboratory audit of Upstate Laboratories, Syracuse, NY, for compliance with regulations outlined in the NYSDEC Analytical Services Protocol.

U.S. Air Force Center for Environmental Excellence - Functioned as Quality Assurance Officer for several USAF projects involving laboratory quality oversight and data validation oversight.

Railcar Manufacturer - Performed audit at the OHM Mobile Laboratory utilized to analyze over 1500 samples for PCBs using USEPA Method SW-846 8081.

PRP Group - Prepared a QAPP in connection with the Tennessee Department of Environmental Conservation Voluntary Cleanup, Oversight, and Assistance Program guidance.

GTE - Prepared a QAPP in accordance with NYSDEC guidance which addressed ground water, soil, and surface soil samples to be analyzed for organics, inorganics, and radionuclides.

General Motors - Prepared a QAPP in accordance with USEPA CERCLA and Michigan Department of Natural Resources guidelines.

Smith Corona - Prepared a data collection QAPP to address the ground water monitoring associated with operation, maintenance, and monitoring activities of a ground water treatment system.

ANALYTICAL CHEMISTRY:

Ms. Storne's responsibilities while at O'Brien & Gere Laboratories involved GC/MS analysis of drinking water, wastewater, sediment, soils, industrial effluents, and hazardous waste. Included with these responsibilities were quantitation and interpretation of mass spectral data, QA/QC analysis of data, and instrument maintenance. Ms. Storne is experienced in USEPA Contract Laboratory Program (CLP) and USEPA Methods 624 and 8240, data interpretation, documentation, diskette deliverable generation, and quality control requirements. Projects in which Ms. Storne has participated include:

Niagara Mohawk Power Corporation - An RI/FS for NYSDEC which involved processing 70 samples in a two-week period. Tasks included the analysis, data review, and generation of CLP deliverable packages for the entire program.

U.S. Army Corp of Engineers, Raritan Arsenal Site RI/FS - Analyzed approximately 140 samples in 3 months for volatile organics by CLP protocol with full documentation, chain-of-custody, and generation of evidence files.

U.S. Army Corp of Engineers, Fort Leavenworth Military Reservation - Analysis of over 150 soil samples for GC/MS volatile organics for an RI/FS.

U.S. Air Force, Duluth International Airport Site - Interim Remedial Measure/Ground Water Monitoring of the Duluth IAP. Responsibilities included sample analysis and generation GC/MS VOA data, along with review of final laboratory package.

Electronics Manufacturer - REI involving GC/MS volatile analysis of soil samples by CLP protocol.

AlliedSignal, Semet Ponds Site - Analysis of water and soil samples for site assessments as part of an RI/FS program in connection with an industrial site in Solvay, NY.

PROFESSIONAL AFFILIATIONS

American Chemical Society

SPECIAL TRAINING

Hazardous Waste Operations Training, 40-Hour OSHA Certificate
ISO 9000 Internal Auditor Training Course

Hewlett Packard Mass Spectrometry Techniques and Interpretation Course, 1988
Audited CHE 575 Organic Spectroscopy, Syracuse University, 1989

PUBLICATIONS

Vacuum-Ultraviolet Emission Detection of Organometallic Multiphoton Ionization and Discharge Processes in Bulk Gases. The Journal of Physical Chemistry, 1992, Jeanne M. Hossenlopp, Karen A. Storne, and J. Chaiken.

Common Laboratory Errors That Lead to Rejected Environmental Data: Awareness and Solutions, Proceedings of the International Symposium of the American Public Works Association, April 1995.

A Criteria Review of New USEPA Quick Turnaround Methods. Water Environment Federation Symposium, Environmental Laboratories: Testing the Waters, August 1995.

EPA's Quick Turnaround Methods, the Limits to No-Wait Analysis. Waste Environmental Laboratory Solutions, April/May 1996.

Establishing Baseline Field QC Requirements: EPA's Quick Turnaround Methods, Specialist Workshop on Field-Portable Chromatography and Spectrometry, June 1996, Karen Storne, Howard Fribush (USEPA).

Automated Data Validation: What Are the Limitations, Proceedings of the Waste Testing and Quality Assurance Symposium, July 1996.

O'Brien & Gere Operations, Inc.

Joseph W. Perry
Technician

PROJECT ASSIGNMENT

Field Team

PROFESSIONAL PROFILE

Mr. Perry has performed site investigation and field work for public and private sector clients.

YEARS OF EXPERIENCE

With O'Brien & Gere: 3
With Other Firms: 0

EDUCATION

BS/1997/Biology

TECHNICAL EXPERIENCE

- Ground water and soil sampling
- Surface water and sediment sampling
- Stream surveys
- Ground water treatment system operations, maintenance, and trouble shooting

REPRESENTATIVE PROJECTS

ECOLOGICAL ASSESSMENTS:

Private Client; Southeast MO - Conducted an ecological assessment of a stream flowing through property occupied by the client's facility. The client's activities included mining, screening, and cooking limestone. The objective of the ecological assessment was to establish the extent and duration of potential impacts to biota from elevated pH. Comparisons were made between the study stream and a reference stream within the same watershed to evaluate long-term effects of elevated pH on the physical and biological characteristics of the system. Comparisons of fish and macro invertebrate communities between the study stream and reference stream were based on community analyses of diversity, equitability, and the index of biotic integrity.

ENVIRONMENTAL SITE ASSESSMENTS (ESAs):

Nabisco, Inc.; St. Louis, MO - Performed an ESA of a distribution facility in accordance with ASTM Standard Method E-1527 and included a records review, site reconnaissance, and interviews with Nabisco personnel. To assess potential environmental concerns at the site, a review of past and present uses of the property, adjoining parcels, and surrounding properties and visual observations of structures and surrounding grounds were performed. Issues of concern included use, treatment, storage, and disposal or generation of hazardous substances or petroleum products, as well as the presence of potential polychlorinated biphenyl (PCB)-containing electrical equipment and asbestos-containing materials.

Metropolitan St. Louis Sewer District; St. Louis, MO - Performed a Phase I ESA of the former Bonfils Wastewater Treatment facility in accordance with the ASTM Standard E-1527. Activities included investigation of the property to assess the presence or potential presence of hazardous materials that may have been used, released, spilled, or disposed on the property. Historical use of the property, as well as that of the surrounding properties, was also investigated through the review of aerial photographs and state and federal regulatory databases.

UNDERGROUND STORAGE TANK (UST) MANAGEMENT:

City of St. Louis, MO - Prepared UST closure reports for several UST closure sites within the City of St. Louis.

City of St. Louis, MO - Developed contract documents, drawings, and cost estimates for UST closures at the Dollar Rent-A-Car facility located at Lambert-St. Louis International Airport.

The May Design & Construction Company; Paramus, NJ - Prepared a UST closure report for closure of a 10,000-gal UST located at the Ridgewood Lord & Taylor Department Store in Paramus, NJ.

City of St. Louis, MO - Supervised site construction activities associated with the removal of four gasoline USTs and one waste oil UST, and the demolition of on-site facilities at the Dollar Rent-A-Car facility located at Lambert-St. Louis International Airport. Activities included supervision of petroleum-impacted soils removal and site restoration efforts.

HAZARDOUS WASTE MANAGEMENT:

The May Department Stores Company; Indianapolis, IN - Conducted quarterly ground water monitoring in support of corrective action associated with the closure of USTs. Activities also included operation, maintenance, and trouble shooting of on-site ground water remediation equipment.

The May Department Stores Company; Cleveland, OH - Conducted quarterly ground water monitoring , operated and maintained a passive free-product bailer system, conducted a pilot study to evaluate the feasibility of using soil vapor extraction/air sparging as an effective technology for on-site remediation.

AlliedSignal, Inc.; Vincennes, IN - Conducted ground water monitoring for the former Prestolite Battery site. Activities included water level measurements, well development, hydraulic conductivity testing, and surface water and sediment sampling.

City of Keokuk, IA - Conducted ground water monitoring at an abandoned city landfill. Activities included well development, hydraulic conductivity testing, and surface water and sediment sampling.

Alcan Corporation; Terre Haute, IN - Conducted quarterly ground water sampling to monitor on-site fluctuations of trichloroethylene (TCE) concentrations. Completed an air sparging and soil vapor extraction pilot study to assess the applicability of these technologies to remediate a TCE source area at the facility under the Indiana Department of Environmental Management Voluntary Remediation Program.

O'Brien & Gere Engineers, Inc.

David E. Haverdink
Design Engineer

PROJECT ASSIGNMENT

Field Team

PROFESSIONAL PROFILE

Mr. Haverdink has performed site investigation and field work for both private and public sector clients.

YEARS OF EXPERIENCE

With O'Brien & Gere: 3
With Other Firms: 0

EDUCATION

BS/1996/Civil and Environmental Engineering

BA/1996/Mathematics

REGISTRATIONS

Engineer-in-Training: MO

TECHNICAL EXPERIENCE

- Storm water/wastewater/drinking water management
- Hazardous waste management
- Environmental site assessments
- Underground storage tank management
- Air pollution management

REPRESENTATIVE PROJECTS

HAZARDOUS WASTE MANAGEMENT:

US Air Force; Whiteman AFB, MO - Assisted in the design of a soil sampling matrix, prepared the Sampling and Analysis Plan, and provided oversight of field sampling activities. The activities were performed to support the Installation Restoration Program at the Air Force Base. Prepared Decision/Closure Documents and the sampling report associated with the sampling event.

US Air Force; Whiteman AFB, MO - Evaluated remedial technologies, bench-scale treatability study results, and analytical data to perform a Focused Feasibility Study for pesticide-impacted soils on the base. Researched low temperature thermal desorption, bioremediation, soil washing, and excavation/disposal in relation to their effectiveness, implementability, and cost for treatment of chlordane-impacted soil.

US Air Force; Whiteman AFB, MO - Prepared the Work Plan and Health and Safety Plan Addendum for field-scale treatability study activities at the base. Coordinated subcontractors to perform various tasks from remediation to analytical work associated with the study. Provided monthly R&D status reports which outlined client correspondences, justified hours worked, summarized monthly activities, and tracked budget allocation.

Venture Stores, Inc.; Moline, IL - Performed ground water monitoring well sampling and maintenance of an air stripper remedial unit.

ENVIRONMENTAL SITE ASSESSMENTS (ESAs)

Wyatt, Tarrant, & Combs, Inc.; Vandalia, IL - Conducted a Phase I ESA of a warehouse facility according to American Society of Testing and Materials (ASTM) standards for property transaction purposes. Subsequent activities included the removal of an underground storage tank (UST).

Nabisco, Inc.; Cairo, IL - Conducted a Phase I ESA according to ASTM standards of an office/warehouse facility, neighbored by a former manufactured gas plant which was undergoing remediation. Other issues involved potential asbestos-containing materials and polychlorinated biphenyls (PCBs).

UNDERGROUND STORAGE TANK PROJECTS

Major US Retailer; Nationwide - Prepared state reimbursement packages associated with UST activities in Ohio, Indiana, and Texas. Assembled data from project files, reviewed applicable state regulations, and verified historical invoiced amounts.

Kraft Foods, Inc.; Melrose & New Ulm, MN - Finalized state reimbursement applications for two sites in Minnesota which had USTs removed and site remediation performed.

Kraft Foods, Inc.; Nationwide - Investigated the state reimbursement eligibility of 43 UST sites in 16 states. Reviewed project files and applicable state regulations, corresponded with state agencies, and reported on eligible sites.

Venture Stores, Inc.; Moline, IL - Assisted in the performance of a project seeking state reimbursement for USTs removed from the site.

AIR POLLUTION MANAGEMENT

Jefferson Smurfit Corporation; Nationwide - Assisted in completion of air emissions inventories for facilities in the Container Division of Jefferson Smurfit Corporation. Utilized spreadsheets for computations and presentation of results in summary reports.

SPECIAL QUALIFICATIONS

40-Hour Initial Training, Hazardous Waste Operations and Emergency Response

8-Hour Supervisor Training, Hazardous Waste Operations and Emergency Response

Solutia-Queeny; St. Louis, MO - Measured ground water elevations in an extensive ground water monitoring well system. Data obtained were used to develop ground water contour maps.

U. S. Air Force; Whiteman AFB, MO - Conducted soil sampling in support of the U. S. Air Force Installation Restoration Program for removal of chlordane-impacted soil. Activities included on-site chemical analysis of impacted soil.

General Metal Products; St. Louis, MO - Conducted quarterly sewer sampling. Operated plant water pretreatment system to reduce metals concentrations prior to discharge to the Metropolitan St. Louis Sewer District sewer system.

EMERGENCY/EPISODE PLANNING:

National Steel Corporation; Granite City, IL - Completed departmental emergency procedure response plans and regulatory agency-mandated updates at a large steel plant according to RCRA contingency and OSHA guidelines. Items of concern include emergency evacuation, personnel safety, and hazardous materials storage and containment.

WATER RESOURCES MANAGEMENT:

Ball-Foster Glass; Pevely, MO - Performed a records review of existing wetlands delineation information compiled by the US Fish & Wildlife Service (USFWS), the US Army Corps of Engineers (USACOE), and the US Soil Conservation Service (USSCS) to assess the possible presence of wetlands habitat on the property owned by Ball-Foster Glass. The information found during the records review was verified during a field investigation by O'Brien & Gere and by correspondence with the USFWS, USACOE, and USSCS. The findings of the record review and field investigation were summarized in a letter to Ball-Foster Glass.

AIR POLLUTION MANAGEMENT:

Ford Motor Company; Hazelwood, MO - Prepared a stack and exhaust vent inventory database in conjunction with completion of a Title V air permit application for the facility. The database included stack identification, emission sources, coordinates, elevation, flow rates, and temperatures.

PROFESSIONAL ASSOCIATIONS

American Institute of Biological Sciences

SPECIAL QUALIFICATIONS

40-Hour Initial Training, Hazardous Waste Operations and Emergency Response

8-Hour Supervisor Training, Hazardous Waste Operations and Emergency Response

Certified State of Illinois Class K Industrial Wastewater Treatment Works Operator

Savannah Laboratories

Sample Analysis

Project Team Resumes

Janette D. Long

Corporate Vice President

Job Description & Responsibilities

- Coordinates the efforts of the project management and operational staff of the Savannah Division.
- Direct responsibility for the marketing and management of the environmental services provided.
- Oversees daily operations, including technical and support staff concerns; work load management; integration of non-routine analytical services; expansion of analytical services; expansion of analytical capabilities; and application of the Laboratory Information Management System (LIMS) to meet client, state and federal programs regulatory requirements.
- Participates in internal and external audits by government, state and private sector clients.

Academic Background

- B. S. Chemistry, 1977
  Armstrong Atlantic State University, Savannah, GA

Previous Employment Career Experience

- Research Chemist , University of Georgia Experiment Station.

Skills and Training

- Organic method experience includes GC, GC/MS, HPLC, and IR.
- Inorganic background includes techniques such as AA-GF, ICP, cold vapor, manual and automated spectrophotometry and various wet chemical titrimetric and gravimetric procedures.
- Experience with project management support for DOE and DOD (HAZWRAP, NFESC, AFCEE, and COE) program sites nationwide.
- Participated in the development of agency-approved laboratory QAP and QAPJPs, special method development and validations where EPA methods are not available, and analytical method selections to meet project specific requirements.
- Has provided technical support for analyses related to RCRA, CERCLA, NPDES, UST, SDWA and CWA programs.

Professional Affiliations

- American Chemical Society
- Water Pollution Control Federation
- ACIL
- IAETL

Janette D. Long

Corporate Vice President

Publications

- Co-authored several research papers in conjunction with her analysis and evaluation of biological tissue, enzymes and water matrices.
- Additional papers co-authored concerning the epidemiological aspects of heavy metal exposure on human health in the Southeastern United States.

James W. Andrews, Ph.D.

Corporate President

Job Description & Responsibilities

- Administrative functions as CEO.
- Evaluation and interpretation of environmental data.
- Responds to the advisory needs of engineers, environmental specialists, legal experts, and production personnel.
- Designs and equips environmental laboratories.
- Private consultant on environmental and water quality chemistry.

Academic Background

- Ph.D. Nutritional Biochemistry, 1968
  University of Georgia, Athens, GA
- M. S. Nutritional Biochemistry, 1965
  University of Georgia, Athens, GA
- B. S. Chemistry, 1962
  University of Georgia, Athens, GA

Previous Employment Career Experience

- Environmental chemist, Continental Forest Industries; 1 year.
- Research assistant and lecturer, University of Georgia; 5 years.
- Scientist, Skidaway Institute of Oceanography, Savannah, GA; 7 years.

Skills and Training

- Developed techniques for reducing water and air pollution from pulp and paper mills and water quality evaluations of streams.
- Principal investigator at Skidaway Institute of many biological, physiological and fish cultural studies.
- Past involvement in several multi-national research projects which were designed to relate environmental and dietary exposure to cardiovascular health.
- Involvement in analytical methods development and the adaptation of methods to specific matrices.
- Worked with the EPA on RCRA and drinking water methods.
- Worked with the National Environmental Laboratory Accreditation Program.

Professional Affiliations

- Member of a National Academy of Sciences subcommittee on aquatic nutrition.
- ACIL Environmental Committee

Publications

- Author of more than 70 research papers in the aquatic field.

Jack R. Tuschall, Ph.D.

Laboratory Director, Savannah Division

Job Description & Responsibilities

- Responsible for the operational performance and strategic growth of the Savannah Division Laboratory.
- Oversees the Laboratory Manager.
- Monitors the quality and timeliness of data deliverables.
- Works directly with clients to ensure that Project objectives are achieved.

Academic Background

- Ph.D. Environmental Engineering Science, 1981
  University of Florida, Gainesville, FL
- M. S. Environmental Engineering Science, 1978
  University of Florida, Gainesville, FL
- B. S. Chemistry, 1972
  Colorado State University, Ft. Collins, CO

Previous Employment Career Experience

- President, EcoTek Laboratory Services
- Manager Lionville Laboratory, Roy F. Weston, Inc.
- Chief Chemist, Northrop Services, Inc.
- Associate Research Scientist, Illinois State Water Survey
- Laboratory Manager, CDM/Limnetics, Inc.

Skills and Training

- Extensive experience in managing full-service analytical laboratories, analytical methods development; design, implementation, and management of environmental monitoring programs; trace organic, inorganic, and mixed-waste analyses; Pulp and Paper Methodology; design and implementation of quality assurance programs; and production and use of analytical reference standards.
- Co-designed the Draft Research plan for the U.S. EPA's National Stream Survey: Phase I-Pilot Study, which was the prototype for the national program to assess the impact of acid rain on streams. Served on the management team during implementation of the study.
- Conducted research on the fate and transport of hazardous materials in aqueous media.
- Coordinated field and laboratory activities for limnological studies in the Oklawaha Chain of Lakes and Lake Okeechobee.
- Conducted research on the fate of heavy metals in two wetland ecosystems, and on the thermodynamics and speciation of metal-organic interactions.

Jack R. Tuschall, Ph.D.

Laboratory Director, Savannah Division

Skills and Training (con't)

- Participated in an environmental evaluation of the thermal effects of three nuclear and coal-fired power plants for Wisconsin Electric Power Company over a three year period.

Professional Affiliations

- American Chemical Society
- American Society of Testing and Materials
- Society of American Military Engineers
- Standard Methods-Joint Task Group Member
- Security Clearances (inactive)--Department of Energy (L) and Nuclear Regulatory Commission (L/R)

Publications

- Author of over 20 technical publications in various books and journals.

C. Henry Beauchamp

Laboratory Manager, Savannah Division

Job Description & Responsibilities

- Oversees a staff of Section Production Managers and Department Supervisors.
- Assists with technical decisions, instrument troubleshooting, and various administrative responsibilities.
- Coordinates with Project Managers and Technical Managers a variety of high profile and rush projects.

Academic Background

- B.S. Chemistry , 1983
  University of Florida, Gainesville, FL

Previous Employment Career Experience

- Savannah Laboratories, Tampa Division, Laboratory Manager; four and one-half years.
- Savannah Laboratories, Tallahassee Division, Laboratory Manager; two years.

Skills and Training

- GC and GC/MS applications by Hewlett-Packard, Restek, J&W Scientific and Varian.
- Volatile GC and GC/MS sample introduction by Tekmar.
- HPLC applications by Waters.
- Radiation safety control by Florida DHRS.
- Chemical residue analysis by the Florida Department of Agriculture.
- Extensive knowledge of environmental analytical protocol includes EPA Water, Wastewater and Cluster Rule Monitoring, and SW-846; APHA Standard Methods; NCASI; TAPPI; ASTM; AOAC; and NIOSH procedures.

Professional Affiliations

- Tampa Bay Association of Environmental Professionals, member 1993 to 1997

Elizabeth C. Beauchamp

Project Manager, Savannah Division

Job Description & Responsibilities

- Primary contact with assigned clients.
- Identifies analytical goals and data quality objectives.
- Provides technical support during field work preparation.
- Coordinates the dispatch of sample containers.
- Helps to prepare quality assurance project plans.
- Assists the client in selecting analytical methodology.
- Tracks the progress of a project through data production.
- Reviews the final report for content and to ensure client format requirements are met.
- Ensures the shipment of required deliverables.
- Coordinates the downloading of all electronic data.

Academic Background

- B. S. Biology, 1990
  Florida State University, Tallahassee, FL

Previous Employment Career Experience

- Project Manager, Savannah Laboratories, Tampa Division; 4 years.
- Section Manager, Savannah Laboratories, Tallahassee Division; 2 years.
- Analyst, Savannah Laboratories, Tallahassee Division; 1 year.
- Project Manager, Pace, Inc.; 1 year.

Skills and Training

- GC and GC/MS applications by Hewlett Packard, Varian and Tekmar Associates.
- Automated Chromatography Data Systems by PE-Nelson.
- Client Service and Management training by Dunn & Bradstreet.
- Experience in groundwater, wastewater and Cluster Rule monitoring; stormwater run-off characterization for NPDES permits; UST site investigation and remediation; petroleum product identification; RCRA remediation and closure; waste stream characterization; cleanup and emergency response; thermal treatment of contaminated soils; bioremediation; ambient air monitoring; indoor air quality; drinking water monitoring; and other special programs including Navy NEESA, US DOE HAZWRAP, and EPA CLP validatable data packages.
- Organic experience includes volatile organic analyses by GC/Hall/PID/FID and GC/MS, HPLC/UV/FL and IR techniques, and base neutral/acid extractables by GC/MS.

Elizabeth C. Beauchamp

Technical Project Manager, Savannah Division

Skills and Training (con't)

- Knowledge of inorganic methods includes Flame AA, ICP, TOX, TOC and many manual and automated titrimetric, spectrophotometric and gravimetric methodologics.
- Extensive experience with EPA water methods, SW-846, and other approved methodology including NCASI, TAPPI, ASTM, AOAC, NIOSH, OSHA, AFPC, and APHA Standard Method procedures.

Professional Affiliations

- Society of American Military Engineers, member since 1994.
- Tampa Bay Association of Environmental Professionals, member from 1993 to 1997.

Bernard Kirkland

Technical Manager-Semivolatile Organics, Savannah Division

Job Description & Responsibilities

- Provides technical oversight of the Semivolatile Organics Preparation and Analytical Departments and client/SL Project Management interface support.
- Oversees non-routine instrument maintenance and troubleshooting.
- Implements Savannah Laboratories quality assurance programs; performs quality control spot checks on data.

Academic Background

- B. S. Chemistry, 1989
  Savannah State College, Savannah, Georgia

Previous Employment Career Experience

- Department Manager of Semivolatile Organics, Savannah Division; 2 years.
- Chemist, Savannah Division; 3 years.

Skills and Training

- Well versed in alumina and GPC cleanup techniques employing the Zymark Benchmate 2000 robotic system, extract concentration and the derivitization of herbicide extracts.
- Proficient in the application of computer systems, such as the Hewlett Packard RTE, and Hewlett Packard Chemserver (UX), Varian Data Acquisitions Systems, and DOS/Windows software and data acquisition and management.
- Familiar with SW-846, CLP, 40 CFR, ASTM, NCASI, TAPPI and Standard Methods.
- Familiar with a variety of client-specific protocols such as HAZWRAP, NFESC, AFCEE, UMTRA, and CLP SOW, OLMO1.9, 3.0, 3.1, ILMO2.1, 3.0, 4.0, OLCO2.1.

Myron J. Young

Technical Manager- Volatile Organics, Savannah Division

Job Description & Responsibilities

- Oversees the Volatile Gas Chromatography and Volatile GC/MS Departments daily technical and production operation.
- Provides technical guidance for project management as related to client quality assurance plan issues.
- Supervises maintenance and troubleshooting of both Volatile GC and Volatile MS instrumentation.
- Coordinates training through supervisors and evaluates training progression by frequent review of new employees' work.
- Implements new analytical procedures, method development and validation.
- Implements Savannah Laboratories quality assurance programs and performs quality control spot checks on data.

Academic Background

- B. A. Chemistry, 1986
  Albany State College, Albany, Georgia
- A. S. Electronic Engineering, 1990
  Savannah Technical Institute, Savannah, Georgia

Previous Employment Career Experience

- Department Manager, Savannah Division; 6 years.
- Department Supervisor, Savannah Division; 3 years.
- Chemist, Savannah Division; 1 year.
- Chemist, Southeast Laboratories, Atlanta; 1 year.
- M.B.S.R. Research Assistant Aid; 1 year.

Skills and Training

- Experienced with techniques for performing analysis employing GC and GC/MS instrumentation for the quantitation of volatile compounds in soil, water, air and biota matrices.
- Knowledgeable in SW-846, 40CFR, CLP, ASTM, NCASI, TAPPI and Standard Methods.
- Well versed in a variety of client-specific protocols such as HAZWRAP, NFESC, AFCEE, UMTRA, and CLP.
- Proficient in the application of computer systems such as the Hewlett Packard RTE, and Hewlett Packard Chemserver (UX), Varian Data Acquisitions Systems, and DOS/Windows software and data acquisition and management.

Myron J. Young

Technical Manager- Volatile Organics, Savannah Division

Publications

- Young, M.J. The Georgia Journal of Science. **1986**, **44**, #1-2.

Ernest B. Walton

Technical Manager-Inorganics, Savannah Division

Job Description & Responsibilities

- Assists in the preparation and implementation of inorganic SOPs.
- Investigates and evaluates new methodology and equipment to be used by the department.
- Provides technical guidance for project management as related to client quality assurance plan issues.
- Implements Savannah Laboratories quality assurance programs and performs quality control spot checks on data.
- Oversees non-routine instrument maintenance and troubleshooting.
- Performs final QA review on IDOC/MPS/PE/MDL samples. Evaluates performance of analysts and documents their proficiency.
- Coordinates training through supervisors and evaluates training progression by frequent review of new employees' work.

Academic Background

- B. S. Chemistry, 1983
  Mercer University, Macon, Georgia

Previous Employment Career Experience

- Savannah Laboratories, Savannah Division, Corporate and Inorganic Manager; 6 years.
- Chemist, Supervisor, Manager, Savannah Division; 9 years.

Skills and Training

- Experienced in clean room sample preparation techniques and numerous studies involving ultra trace metals determinations, inductively coupled plasma spectroscopy, and atomic absorption methodology.
- Well versed in techniques involving automated, semi-automated, and manual nutrient analysis systems, as well as general chemistry parameters outlined in Standard Methods, EPA and ASTM protocols; NCASI and TAPPI.
- Extensive experience in the production and review of data packages.
- Participated in the ICP/AA training courses (Perkin Elmer), the ICP training course (Thermo Jarrell Ash), and the Autoanalyzer training course (Technicon).

Environmental Standards

Data Validation

Project Team Resumes

ENVIRONMENTAL STANDARDS

KATHLEEN A. BLAINE

Quality Assurance Specialist/Principal

FIELDS OF COMPETENCE

- Analytical services design.
- Litigation support.
- Documentation for litigation support.
- Data validation for analytical and environmental chemistry.
- Multi-media fate and transport mechanisms of pollutants.
- Petroleum-related litigation support and technical oversight.
- RFP preparation.
- Analytical data adequacy determination for RI/FS, RCRA, RFIs, RCRA Permit B, and delisting studies.
- Sampling protocols.
- Technical liaison among laboratories, industries, and consultants.
- Theoretical and practical knowledge of all facets of quantitative analysis for organic and inorganic pollutants by US EPA methodologies.
- Laboratory auditing.
- Third-party reviews of Quality Assurance Project Plans.

CREDENTIALS

B.S., Chemistry, Butler University, Indiana, 1984.

Wright State University, Ohio. Graduate Chemistry Course Work.

PROFESSIONAL AFFILIATIONS

US EPA Certified Drinking Water Laboratory Certification Officer - Chemistry and Microbiology
American Chemical Society
American Society of Testing and Materials
(Subcommittees D18.21-D18.99)
AOAC International
American Association for Laboratory Accreditation (A2LA)

SUMMARY OF EXPERIENCE

Ms. Blaine has over thirteen years of analytical/quality assurance experience. Specifically, she has four years of analytical experience performing analyses for organic and inorganic contaminants in a variety of media by instrumental and classical methods, including research and development of dioxin and furan soil and water partitioning. As a Quality Assurance Specialist, Ms. Blaine performs complex data validations for all media and project types. Ms. Blaine is a recognized expert in the fields of organic and inorganic data validation (including specialty analyses); laboratory auditing; preparation of third-party review of quality assurance project plans (QAPjPs) for remedial investigations/feasibility studies (RI/FS), Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Conservation, and Liability Act (CERCLA) and remedial actions; design of quality assurance programs; and agency negotiations.

Prior to joining Environmental Standards, Ms. Blaine was the Divisional Laboratory Administrator and Quality Assurance Manager for a large environmental consulting firm with ten offices nationwide. She designed and implemented a quality assurance and data validation program for all RI/FSs, site inspections, and RCRA closures. Her responsibilities included the preparation of QAPjPs for Superfund studies in US EPA Regions II, IV, V, VII, VIII, and X. She also trained and managed a staff of four data reviewers. In addition, Ms. Blaine has been one of the top ranked A2LA Environmental Laboratory assessors for the past nine years.

ENVIRONMENTAL STANDARDS Inc

Prior to that position, Ms. Blaine had two years of experience as an organic and inorganic laboratory supervisor with a primary US EPA Superfund contractor. She provided quality assurance reviews for all analytical data generated within the laboratory, based upon rigorous examination of gas chromatography (GC), GC/mass spectroscopy (MS) (high and low resolution), graphite furnace atomic absorption (GFAA), and inductively coupled plasma (ICP) data.

KEY PROJECTS

- Performed data validation for more than 600 RI/FSs, RFIs, CERCLA RFIs, remedial actions, and for routine monitoring projects on data generated by more than 40 laboratories on projects throughout the United States.

- Prepared QAPjPs, which included formulation of data quality objectives (DQOs), for more than ten privately funded RI/FS, RFIs, and remedial actions (e.g., drum removals) for submission to federal and state regulatory agencies. Also, performed third-party review and comment on QAPjPs prepared by other entities for a significant number of RI/FSs and RFIs prior to submission of the documents to the lead regulatory agency.

- At the request of Fortune 500 companies, A2LA, and, in some instances, laboratories themselves, performed comprehensive laboratory audits on over 150 laboratories nationwide in the areas of organic analyses, inorganic analyses, classical parameters, and specialty analyses. Provided critical comments, recommendations, and performance evaluation (PE) reports.

- Prepared a significant number of comprehensive Requests for Proposals (RFPs) for analytical services for a wide variety of large short- and long-term environmental investigations. Evaluated laboratory proposals, provided recommendations for award, and participated in contract negotiations.

- Trained and supervised a staff of four quality assurance personnel between three environmental consulting offices. In addition, conducted numerous training seminars on environmental quality assurance for environmental project managers.

- Prepared laboratory bid specifications for several Fortune 500 companies as part of a laboratory selection process.

- Reviewed numerous site specific data packages in order to provide technical advice in association with potential litigation.

PUBLICATION

Adams, W. and K. A. Blaine. "Dioxin Soil-Water Partitioning Coefficients." Chemosphere (October 1984).

ENSR

Human Health Risk Assessment

Project Team Resumes

Lisa J. N. Bradley, Ph.D., D.A.B.T.

Years Experience: 16

Technical Specialties

- Mechanisms of Carcinogenesis and Mutagenesis
- Risk Assessment

Professional History

- ENSR Consulting and Engineering, 1991-present
- Massachusetts Institute of Technology
- University of Idaho

Education

- PhD (Toxicology) Massachusetts Institute of Technology, 1991
- BS (Zoology) University of Idaho, 1983
- BS (Chemistry) University of Idaho, 1983

Professional Registrations and Affiliations

- Diplomate, American Board of Toxicology, 1994
- Society of Toxicology
- Boston Risk Assessment Group
- Society for Risk Analysis
- Phi Beta Kappa
- Regulatory Toxicology and Pharmacology

Representative Project Experience

A. Risk Assessment and Regulatory Toxicology

U.S. Steel, Relative Toxicity Ranking, Pennsylvania. Conducted a relative toxicity ranking of U.S. Steel's 1996 SARA Title 3 Section 313 Toxics Release Inventory (TRI) based on available human health and ecological toxicity criteria. Report was prepared to support facility personnel field questions from the public about the TRI.

U.S. Steel, Development of a Standardized Risk Evaluation Guidance Manual, Pennsylvania. Worked in conjunction with another firm and USS personnel to develop a standardized Risk Evaluation Guidance Manual for USS. The manual addresses important issues in human health and ecological risk assessment, provides background for the issues, USS strategy to address the issues, and examples of standard language and references to be used in future USS reports. The manual will allow for more cost-effective and consistent risk evaluations to be conducted for USS facilities and sites.

U.S. Steel, Developing Human Health Risk Assessment, Indiana. Working towards the development of the human health risk assessment for the Gary Works, Indiana.

Activities have included response to regulatory comments on previous reports, site visits, review of reports generated both by USS and by local groups about the facility and its environs, and development of the risk related portions of the facility-wide RCRA RFI workplan.

Columbia Gas Transmission, Strategic Risk Assessment Advisor, West Virginia. Serving as strategic risk assessment advisor to a multi-site, ten-state AOC with U.S. EPA Region III. Responsibilities include review of other contractor reports, development of a common strategy for TPH and mercury to be used in the program, review and summary of risk assessment regulations and guidance for each of the states (Ohio, Pennsylvania, West Virginia, Virginia, Kentucky, North Carolina, Delaware, New Jersey, Maryland, New York, and Louisiana), and conduct risk assessments.

Manufacturer, Human Health Risk Assessment, South Carolina. Conducted the human health risk assessment under the purview of USEPA Region IV, for a CERCLA site that was a former manufacturing facility. Employed both the child and adult lead models to evaluate remedial goal options. Incorporated fate and transport modeling to evaluate future groundwater and surface water exposure pathways.

Industri-Plex CERCLA Site, Risk Assessment Review and Strategy for PRP Group, Massachusetts. Providing risk assessment review and strategy for PRP group, and developed risk assessment workplan to address surface water and groundwater exposure pathways.

Confidential Natural Gas Client, Toxicity Assessment, Ohio. Provided toxicity assessment of cleaning compounds proposed for use in the decommissioning of a natural gas pipeline laid on the bed of a reservoir that serves as the primary drinking water source for a community. Demonstrated that even should a catastrophic release of cleaning fluid and/or PCBs occur, human and ecological health would not be adversely affected and that concentrations at the drinking water intake would be much lower than health-based values or detection limits.

Confidential Client, Risk Assessment Support, Pennsylvania. Provided risk assessment support during year-long negotiations with regulatory agency covering multiple sites within the state. Developed risk-based action level for diesel fuel TPH based on direct contact and soil-to-groundwater pathways.

Bridgestone/Firestone, Texas. Developed risk-based cleanup levels for TPH and lead in soils based on the protection of underlying groundwater quality under the TNRCC Leaking Storage Tank Program. TNRCC's approval allowed for the timely remediation of the site for subsequent sale.

Con Edison, New York. Conducted the risk assessment project associated with Con Edison's Spill Remediation Program, a part of the Order on Consent with NYSDEC. Developing a risk-based concentrations (RBC) for the spill materials included in the

program based on a matrix of potential spill location exposure scenarios. Both direct contact and groundwater pathway exposures are addressed in the program. ENSR developed a screening procedure to be used in conjunction with the RBC to enable Con Edison to address and close spill sites in both a cost-effective and health-protective manner. There is ongoing interaction with NYSDEC Spills Program and headquarters personnel in the project.

Tennessee Valley Authority, Human Health Risk Assessment, Tennessee. Prepared human health risk assessment and developed target cleanup levels for an abandoned battery manufacturing site. Primary constituent was lead and both child and adult lead models were used in the evaluation.

Stanley Structures, Texas. Performed a Plan B Exposure and Risk Assessment under the TNRCC Leaking Storage Tank Program. Results indicated that no further action was warranted for the site and allowed for closure of a real estate transaction.

Computer Manufacturing Facility, Arizona. Conducted a risk assessment for diesel fuel TPH in soil at a facility sold by the client, but for which the client maintained environmental liability. Demonstrated using literature data on the components of TPH that the site met the state's cleanup criteria for TPH and its individual components. Agency approval for site closure was obtained. This project was the first risk-based closure under the State of Arizona's Soil Remediation Standards Rule. Use of literature data on diesel composition eliminated the need for additional environmental sampling, reducing project costs. Achievement of official risk-based closure saved the client additional remedial costs and eliminated liability for the property, allowing the real estate transaction to close.

Confidential Client, Idaho. Provided a pulp mill facility with technical review of a state-sponsored air monitoring program conducted in the vicinity of the facility. Provided information on background levels of chloroform in urban and rural areas of the U.S. to support the conclusion that the locally measured concentrations were not significantly different from those for other regions of the U.S. Informed the client and the state about new information on the toxicology of chloroform that is likely to change how chloroform is regulated by the U.S. EPA.

Confidential Client, Toxicology Review, Indiana. Provided a review of the toxicology and potential carcinogenicity of two structurally similar proprietary industrial chemicals. Used recent data on the nongenotoxic/cytotoxic mechanism of action of a class of potential carcinogens to demonstrate that a safe level for worker exposure exists.

Confidential Client, Peer Review, Alaska. Provided peer review for a risk assessment of air emissions performed for a pulp mill in Alaska. Brought to the attention of the client the overly conservative nature of the assessment. In addition, informed the client of new information on the toxicology of chloroform that would have a direct bearing on

the risk estimates for the facility. Based on this review, provided senior oversight for the revisions made to the risk assessment before its submittal to the state.

Confidential Client, Peer Review, Alaska. Provided peer review for a distributional (Monte Carlo) analysis of risk for human health risk assessment of chloroform associated with pulp mill emissions.

Arizona Department of Environmental Quality, Human Health Risk Assessment Implementation, Four Regions, Arizona. Implemented the human health risk assessment for hazardous air pollutants for the State of Arizona in response to a legislative mandate. Four regions of Arizona were chosen for study based on population and geographical characteristics. An inhalation risk assessment was performed for all four regions. Preliminary analyses indicated that a multipathway risk assessment was not warranted. The assessments were based on a detailed emissions inventory and gridded air dispersion model for each region. Risk was evaluated for current conditions as well as conditions predicted upon implementation of controls mandated by the 1990 Clean Air Amendments. The final report was submitted to the Office of the Governor.

Confidential Client, Human Health Risk Assessment, New Jersey. Conducted a human health risk assessment for a school district's baseball fields located adjacent to a potential Superfund site. Report was prepared for community distribution, and results presented at a public meeting.

Confidential Client, New Jersey. Conducted a preliminary human health risk and ecological assessment for a site being considered for inclusion on the NPL using data available for the site. The preliminary risk assessment formed the basis of a Work Plan for the site, was used to identify areas of uncertainty that could benefit from further research, and included evaluation of local state biological water quality criteria.

Confidential Client, Indiana. Conducted agency negotiations (U.S. EPA Region V) concerning the human health risk assessment for a Superfund site. Because arsenic concentrations in groundwater were of concern to the agency, researched and reviewed the toxicological information available for arsenic, and prepared a literature review and critique of the current dose-response values developed by the U.S. EPA for arsenic.

Textile Manufacturer, Human Health Risk Assessment, Pennsylvania. Prepared the human health risk assessment for the RFI at this manufacturing site. Constituents of interest included chlorinated volatile organic compounds (VOC) and volatiles (BTEX) from past petroleum releases. Media included soils, groundwater, and stream water/sediment. Because risk models predicted unacceptable risk levels due to worker exposure to indoor air, an indoor air sampling and analysis program was conducted that demonstrated low or nondetected concentrations of VOC.

National Industrial Dry Cleaning Company, Texas. Analyzed the current literature on the toxicity and carcinogenicity of an important industrial chemical, tetrachloroethylene.

Reviewed the findings and summarized their regulatory implications in a report to the client.

National Oil Company, Human Health Risk Assessment, Virginia. Conducted human health risk assessment for a gasoline and fuel oil holding facility. Developed a toxicity ranking scheme for PAH that do not currently have EPA derived oral Reference Doses. Used the results of the risk assessment and ranking scheme to develop target cleanup levels for PAH in soils and groundwater.

Hazardous Waste Incinerators, Human Health Risk Assessment. Managed the multi-pathway human health risk assessment for the permitting of a proposed facility. Developed toxicological parameters for specific chemicals of concern for use in human health risk assessments for proposed facilities.

Industrial Trade Organization. Reviewed toxicology profiles compiled for 30 compounds of concern to the industry. Reviewed the derivation of the RfD's for methanol and acetone, and proposed alternate values based on analysis of the literature.

Former Industrial Plant Site, Michigan. Developed health-based target cleanup levels for PAHs and related compounds for a tar and oil containing site. Incorporated comparative potency rankings and in situ degradation rates in the development of target cleanup levels.

National Oil Company, Human Health Risk Assessment, Massachusetts. Management of human health risk assessment for a former tank farm facility under the Massachusetts Contingency Plan. Provided critical input on proposed field sampling plans. Identified issues of potential concern at the site by analyzing risks using maximum detect data. Information was used to develop site specific assumptions to be used in the risk assessment.

National Oil Company, Massachusetts. Due to the provisional status of the state-derived dose-response value for methyl-tert-butyl ether, a compound of major importance at the site, performed a thorough study of the toxicity of the compound. ENSR's input into the state's review of the dose-response value had a direct impact on the state's decision to revise the dose-response value. This revision stands to greatly reduce the client's remedial costs.

U.S. Environmental Protection Agency. Developed a strategy for evaluating absorption data in the literature and applied it to the development of absorption adjustment factors for oral and dermal exposures to soil and water for 5 metals of concern at hazardous waste sites (arsenic, cadmium, chromium III, chromium VI, inorganic mercury, organic mercury, and nickel) based on a thorough review of the literature.

Unocal Corporation, Rodeo, California. Health risk assessment task manager for the Unocal San Francisco Refinery Reformulated Gasoline Project. Tasks include preparation and submission to the agency of a protocol for the health risk assessment.

Sun Oil Company, Philadelphia, Pennsylvania. Prepared the Health Assessment of the RCRA Facility Investigation for Sun's Philadelphia Refinery. Developed Action Levels for the chemicals of concern in each solid waste management unit. In addition, prepared and presented in the RFI preliminary Media Cleanup Standards for each unit.

Georgia Pacific, Literature Review, Georgia. Reviewed literature and summarized the current scientific knowledge of the endogenous synthesis of halogenated compounds in humans.

Litigation Support, Massachusetts. Conducted a human health risk assessment following Massachusetts guidelines for a field on which wastewater sludge from a juice manufacturing facility had been applied. Report was prepared for submittal to both parties in the suit.

Beal and Company, Human Health Risk Assessment, Massachusetts. Conducted a human health risk assessment and developed target cleanup levels for soils at a site on which a leaking underground storage tank had been previously located.

Bridgestone/Firestone, Alabama. Developed a site-specific human-health risk based target cleanup level for total petroleum hydrocarbons (TPH) in subsurface soils at a former automobile lubrication facility, based on the components of the lubricating and waste oils used at the site. Results were submitted to the State of Alabama as an alternative to the State's generic TPH target cleanup level.

Confidential Client, Human Health Risk Assessment, Connecticut. Managed and conducted a human health risk assessment for a Superfund site. The site was a former landfill that is currently used for both residential and industrial purposes. Project included meetings and negotiations with U.S. EPA Region I.

Motco Superfund Site, Texas. Reviewed U.S. EPA-developed acute inhalation criteria (AIC) for volatile organics. Developed a consistent and scientifically-defensible methodology for AIC development, and applied this methodology to provide alternative AICs for use at the site.

Brio Site Task Force, Texas. Developed acute inhalation criteria for use in a remedial program for benzene, 1,1-dichloroethane, 1,2-dichloroethane, ethyl benzene, methylene chloride, styrene, toluene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and vinyl chloride.

Confidential Client, Michigan. Developed risk-based air concentrations for subchronic exposures to wood tar constituents for use in a remedial program.

Department of Environmental Quality, Arizona. Developed the risk assessment component of a legislatively mandated hazardous air pollutant (HAP) research plan for the ADEQ. The research plan was developed to aid in the developed of risk assessment guidance for the state's HAP program in compliance with the Clean Air Act.

Confidential Client, New York. Developed an oral reference dose for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) for use in a human health risk assessment for a hazardous waste incinerator, based on review of the literature and current regulatory guidance.

Solar Turbines, Inc., Human Health Risk Assessment, California. Conducted a human health risk assessment as a component of the closure of seven hazardous waste management units and RCRA Corrective Action as administered by the State of California.

SnyderGeneral, Inc., Human Health Risk Assessment, Texas. Conducted a human health risk assessment that evaluated exposures to groundwater containing chlorinated solvents for a facility in California.

Confidential Petroleum Company. Prepared a risk assessment generic standard language document, including selection of exposure scenarios and exposure parameters, for use in an in-house risk assessment system for fuel stations. The prepared document prompted users to enter site-specific data, provided example tables, and prompted user to include or delete receptor/exposure pathway text as appropriate to the specific site.

Confidential Petroleum Company, Human Health Risk Assessment, Rhode Island. Conducted a human health risk assessment for the development of target cleanup levels for an industrial facility. Results were used as litigation support. Dispute settled out of court in favor of the client.

Confidential Client, Arizona. Provided expert review of a risk assessment for submittal to the TNRCC (Texas) prepared by the seller of a parcel of land being considered for purchase by the client.

B. Toxicology Research

Massachusetts Institute of Technology. Postdoctoral Associate, Division of Toxicology. Studied the ability of nitric oxide to crosslink DNA using an oligonucleotide based approach, in the laboratory of Professor Steven R. Tannenbaum. Investigated single adduct mutagenesis in mammalian cells using shuttle vectors, in the laboratory of Professor John M. Essigmann.

Massachusetts Institute of Technology. Research Assistant, Division of Toxicology. Thesis under the direction of Professor John M. Essigmann on 'Mutagenesis and

Genotoxicity of the Major DNA Adduct of cis-Diamminedichloroplatinum(II).' Developed a method to construct site-specific DNA modifications in any genome sequence context, and used this protocol to construct a viral genome containing a single cis-[$Pt(NH_3)_2\{d(GpG)\}$] intrastand crosslink. The mutational frequency, specificity, and genetic requirements for mutagenesis by the adduct were determined. Supervised undergraduate and graduate student research projects.

University of Idaho. Technical Assistant, Toxicology Program, Department of Veterinary Sciences. Worked under the direction of Professor Robert I. Krieger. Responsibilities included tissue analysis of ^{14}C-paraquat in rats, conducting paraquat/inhibitor studies using osmotic pumps in rats, conducting ergot feeding studies in chicks, and performing blood acetylcholinesterase assays.

C. Awards

1986 Society of Toxicology Graduate Fellowship, sponsored by Hazleton Laboratories.

1983 Outstanding Graduate Award, Department of Life Sciences, U. of Idaho.

1983 Merck Award, for outstanding graduate senior in Chemistry, U. of Idaho.

1982 Phi Beta Kappa, U. of Idaho

1982 University of Idaho Alumni Award for Excellence.

Publications

Bradley, L.J.N., and M. Gerath. 'Generic Risk and Fate Analysis for Mercury at Natural Gas Meters.' Paper presented at the December 1998 Society for Risk Analysis Annual Meeting, Phoenix, AZ.

Bradley, L.J.N. and M. Gerath. 'Generic Screening Level Fate and Transport Analysis for Mercury at Natural Gas Metering Sites.' Poster presented at the October 1998 Contaminated Soils Conference, Amherst, MA.

Bradley, L.J.N., K.B. Lemieux, M.C. Garcia, A.H. Parsons, and D.E. Rabbe. Comparison of Concentrations of Selected Metals and Organics in Fish Tissue and Sediment in the Grand River, Ohio, and the Southern Lake Erie Drainage Basin. Human and Ecological Risk Assessment 4(1):57-74 (1998).

Bradley, L.J.N. 'TPH Analyses Provide Means of Direct Assessment of Diesel Releases.' Paper presented at the October, 1997, Contaminated Soils Conference, Amherst, MA.

Bradley, L.J.N. 'Risk Assessment of Hazardous Air Pollutants in Arizona.' Paper presented at the December, 1996 Society for Risk Analysis Annual Meeting, New Orleans, LA.

Bradley, L.J.N. 'Cost-Effective Use of Tiered Approaches in Risk Assessment.' Paper presented at the October, 1996 Annual Conference on Contaminated Soils, Amherst, MA.

Bradley, L.J.N. 'Role of Risk Assessment in Environmental Management.' Invited paper presented at the West Virginia Manufacturers Association Environmental Compliance Conference, May, 1996, Charleston, WV.

Bradley, L.J.N. 'New Toxicology Data for Chloroform: Implications for the Pulp and Paper Industry.' Paper presented at the Technical Association of the Pulp and Paper Industry annual meeting, May, 1996, Orlando, FL.

Bradley, L.J.N. 'New Toxicology Data for Chloroform: Implications for the Pulp and Paper Industry.' Proceedings of the 1996 Environmental Conference of the Technical Association of the Pulp and Paper Industry. Vol 1, pp. 13-16 (1996).

Bradley, L.J.N. 'Ingested Arsenic - Are the Taiwanese Data Appropriate for Risk Assessment in the U.S.' Paper presented at the December, 1994, Society of Risk Analysis Conference, Baltimore, MD.

Bradley, L.J.N. 'Background Levels of PAH in Urban Soils.' Invited paper presented at the March, 1994, Contaminated Soils Conference, Long Beach, CA.

Magee, B.H., and L.J.N. Bradley. 'Absorption Adjustment Factors for Use in Risk Assessment.' Proceedings of the International Congress on the Health Effects of Hazardous Waste. (1994).

Bradley, L.J.N., B.H. Magee, and S.L. Allen. 'Background Levels of Polycyclic Aromatic Hydrocarbons and Selected Metals in New England Urban Soils.' J. Soil Contam. 3(4):349-361. (1994).

Bradley, L.J.N. 'Background Levels of PAH in Urban Soils.' Paper presented at the September, 1993, Contaminated Soils Conference, Amherst, MA.

Bradley, L.J.N. 'Absorption Adjustment Factors for Use in Risk Assessment.' Poster presented at the May, 1993, International Congress on the Health Effects of Hazardous Waste, Atlanta, GA.

Magee, B.H., L.J.N. Bradley, E.L. Butler, A. Dasinger, J. Grabowski. 'Risk-Based Target Clean-Up Levels for TPH in Soils.' In: Hydrocarbon Contaminated Soils. Vol. 3. pp. 303-319. edited by P.T. Kostecki and E.J. Calabrese. 1993.

Bradley, L.J.N. 'Background Levels of PAH in Urban Soils.' Poster presented at the December, 1992, Society of Risk Analysis Conference, San Diego, CA.

Bradley, L.J.N. 'Risk-Based Target Cleanup Levels for TPH in Soils.' Poster presented at the September, 1992, Hydrocarbon Contaminated Soils Conference, Amherst, MA.

Bradley, L.J.N. 'Human Health Risk Assessment Workshop.' Presented at the September, 1992, Hydrocarbon Contaminated Soils Conference, Amherst, MA.

Naser, L.J., A.L. Pinto, S.J. Lippard, and J.M. Essigmann. 'Chemical and Biological Studies of the Major DNA Adduct of cis-Diamminedichloroplatinum(II), cis-[$Pt(NH_3)_2\{d(GpG)\}$], Built into a Specific Site in a Viral Genome.' Biochemistry 27 (1988) 4357-4367.

Naser, L.J., A.L. Pinto, S.J. Lippard, and J.M. Essigmann. 'Extrachromosomal Probes with Site-Specific Modifications: Construction of Defined DNA Substrates for Repair and Mutagenesis Studies.' In DNA Repair: A Laboratory Manual of Research Procedures. Vol. 3. pp. 205-217. Edited by E. Friedberg and P. Hanawalt. 1988.

Pinto, A.L., L.J. Naser, J.M. Essigmann, and S.J. Lippard. 'Site-Specifically Platinated DNA, a New Probe of the Biological Activity of Platinum Anticancer Drugs.' J. Am. Chem. Soc. 108 (1986) 7405-7407.

Bradley, L.J.N., K. Yaremа, S.J. Lippard, and J.M. Essigmann. 'Mutagenicity and Genotoxicity of the Major DNA Adduct of the Anti-tumor Drug cis-Diamminedichloroplatinum(II).' Biochemistry 32: 982-988. (1993).

Menzie•Cura & Associates, Inc.

Ecological Risk Assessment

Project Team Resumes

CHARLES A. MENZIE, Ph.D.

EDUCATION:

Ph.D.	1978	Biology, City University of New York
M.A.	1974	Biology, City College of New York
B.S.	1971	Biology, Manhattan College

EMPLOYMENT HISTORY:

1983-Present — Menzie-Cura & Associates, Inc. Principal. Responsible for providing environmental and risk assessment services related to soil, sediment, surface water and groundwater contamination, industrial and municipal discharges, hazardous waste sites, and RCRA and Right-to-Know Law compliance. Geographic experience includes continental United States, Alaska, Hawaii, Puerto Rico, Bahamas, Australia, Indian Ocean Atolls, Nigeria, and Canada. Voluntarily supports cleanup programs in many states, including Massachusetts, Connecticut, and Rhode Island.

1976-1983 — EG&G Environmental Consultants. Manager of Environmental Services Department. Responsible for staff of Biologists, Chemists, Hydrogeologists, Environmental Scientists, and Regulatory Analysts. Directly responsible for coordinating business development activities related to waste disposal issues in marine, aquatic, and terrestrial environments.

1971-1976 — Lawler, Matusky and Skelly Engineers. Environmental Scientist. Responsible for evaluating the impacts of fossil-fuel and nuclear power plants on rivers, estuaries, and the Great Lakes. Involved in developing 208 plans.

1978-1993 — Boston University and University of Lowell. Lecturer.
Developed and presented graduate-level courses on Risk Assessment, Marine Pollution, and Environmental Science.

1973-1974 — Research Foundation of City University of New York (CUNY). Involved in evaluating impacts of sewage sludge disposal.

PROFESSIONAL AFFILIATIONS:

Water Environment Federation
Society for Risk Analysis, (Past President of New England Chapter)
Society of Exposure Analysis
Society of Environmental Toxicology and Chemistry, (National Liaison to Society for Risk Analysis)
New England Estuarine Research Society
Estuarine Research Federation
Boston Bar Association, (Environmental)
Association for the Environmental Health of Soils
ASTM
Editorial Board for the journal *Human and Ecological Risk Assessment*
Councilor for Society of Risk Analysis

NATIONAL AND INTERNATIONAL COMMITTEES, WORKSHOPS, AND DISTINCTIONS:

SETAC Pellston Conference on Sediment Ecological Risk Assessment
EPA Risk Forum: Ecological Case Studies/Dioxin/Monte Carlo Analyses
National Liaison for the Society of Environmental Toxicology and Chemistry (SETAC) to Society for Risk Analysis, (SRA).

PUBLICATIONS:

Book Chapters

Menzie, C.A., W.J. Heiger-Bernays, C.R. Montgomery, D.G. Linz, and D.V. Nakles. 1996. Development of an ecological risk assessment framework based on contaminant availability. "Ecotox - Environmental Contaminants through the Macroscope." Wuerz Publishing Ltd., Winnipeg, MB, Canada. In Press.

Menzie, C.A. 1996. Perspectives on sediment risk analysis for hazardous waste sites. In: Sediment Risk Assessment Proceedings of the 22nd Pellston Conference Workshop, Pacific Grove, April 23 - 28, 1995. SETAC Special Publication.

Work Group Summary Report for Site Clean-Up Decisions. Chapter 6 In: Sediment Risk Assessment Proceedings of the 22nd Pellston Conference Workshop, Pacific Grove, April 23 - 28, 1995. SETAC Special Publication.

Cura, J.J., G. Mariani, C. Ketchum, R. Gillmor, **C. Menzie**, W. Curtis and B. Tuholke. 1989. Site-selection criteria for deep ocean disposal of low-level radioactive wastes. In M. Champ and K. Park, eds., *Oceanic Processes in Marine Pollution*. Volume 3 - Marine Waste Management: Science and Policy. Kreiger Publishing Co., Melbourne, FL, pp. 177-85.

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Nocito, J.A., H.A. Walker, J.F. Paul, and **C.A. Menzie**. 1986. Application of a risk assessment framework for marine disposal of sewage sludge at mid-shelf and off-shelf sites. In *Proceedings of the 11th ASTM Symposium* by American Society for Testing and Materials. Philadelphia, PA, American Society for Testing and Materials.

Gillmor, R.B., **C.A. Menzie**, G.M. Mariani, D. Levin, R.C. Ayers and T.C. Sauer. 1985. Effects of exploratory drilling discharges on the benthos. In IW. Duedall, D.R. Kester and P.K. Park, eds., *Wastes in the Ocean*. Volume 4 - Energy Wastes in the Ocean, Wiley Interscience Publications, John Wiley & Sons, New York, NY, pp. 244-57.

Robson, D.S., **C.A. Menzie** and H.F. Mulligan. 1980. An environmental monitoring study to assess the impact of drilling discharges in the Mid-Atlantic. II. An experimental design and statistical methods to evaluate impacts on the benthic environment. In Research of Environmental Fate and Effects of Drilling Fluids and Cuttings.

Menzie, C.A., D. Maurer and W. Leathem. 1980. An environmental monitoring study to assess the impact of drilling discharges in the Mid-Atlantic. IV. The effects of drilling discharges on the benthic community. In Research of Environmental Fate and Effects of Drilling Fluids and Cuttings.

Journal Articles

Menzie, C.A. 1998. Risk communication and careful listening – resolving alternative world views. *Human and Ecological Risk Assessment (HERA)*. 4(3):619-622.

Menzie, C.A., and Freshman, J.S. 1997. An assessment of the risk assessment paradigm for ecological risk assessment. *Human and Ecological Risk Assessment (HERA)*. 3(5):853-892.

Menzie, C.A. 1997. Implementing risk management at manufactured gas plant sites. *Soil & Groundwater Cleanup*. August/September. pp12-18.

Menzie, C.A., J.J. Cura, J.Freshman, E.N. LaFrey. 1997. Polycyclic aromatic hydrocarbons (PAH) in

Massachusetts urban runoff and potential for enrichment of near-shore coastal sediments. (Submitted).

Menzie, C.A., M. Hope Henning, J. Cura, K. Finkelstein, J. Gentile, J. Maughan, D. Mitchell, S. Petron, B. Potocki, S. Svirsky, P. Tyler. 1996. Special report of the Massachusetts weight-of-evidence workgroup: A weight-of-evidence approach for evaluating ecological risks. *Human and Ecological Risk Assessment:* (HERA): **2**(2)277-304.

Freshman, J.S., **C.A. Menzie.** 1996. Two wildlife exposure models to assess impacts at the individual and population levels and the efficacy of remedial actions. *Human and Ecological Risk Assessment.* **2**(3):481-496.

Menzie, C.A. 1995. The question is essential for ecological risk assessment. *Human and Ecological Risk Assessment.* (HERA) **1**(3):159-162.

Menzie, C.A., B. Potocki and J. Santodonato. 1992. Exposure to carcinogenic PAHs in the environment. *Environ Sci. Technol.* **26**(7)1278-1284.

Menzie, C.A., D.E. Burmaster, J.S. Freshman and C.A. Callahan. 1992. Assessment of methods for estimating ecological risk in the terrestrial component: A case study at the Baird & McGuire Superfund Site in Holbrook, Massachusetts. *Environ Toxicol Chem.* **11**:245-260.

Callahan, C.A., **C.A. Menzie,** D.E. Burmaster, D.C. Wilborn and T. Ernst. 1991. On-site methods for assessing chemical impact on the soil environment using earthworms: A case study at the Baird & McGuire Superfund Site, Holbrook, MA. *Environ. Toxicol. Chem.* **10**:817-826.

Burmaster, D.E., **C.A. Menzie,** J.S. Freshman, J.A. Burris, N.I. Maxwell and S.R. Drew. 1991. Assessment of methods for estimating aquatic hazards at Superfund-type sites: A cautionary tale. *Environ. Toxicol. Chem.* **10**:827-842.

Menzie, C.A. 1984. Diminishment of recruitment: A hypothesis concerning impacts on marine benthic communities. *Marine Pollution Bull.* **15**:127-129.

Menzie, C.A. 1983. Environmental concerns related to offshore oil and gas activities: Muddy issues. *Oceanus* **26**:32-38.

Menzie, C.A. 1982. Contamination control can be cost effective. *Industry Magazine.* pp. 19-22. August 1983.

Menzie, C.A., J.J. Cura and W.F. Skinner. 1982. Thermal impact evaluation for Brunner Island Steam Electric Station: Toward a more realistic assessment. *Environ. Monitoring and Assessment* **2**:301-308.

Menzie, C.A. 1982. The environmental implications of offshore oil and gas activities: An overview of the effects of routine discharges based on the American experience. *Environ. Sci. Technol.* **16(8)**:454A-472A.

Maurer, D., W. Leathem and **C.A. Menzie**. 1982. Macrobenthic invertebrates from the Mid-Atlantic continental shelf. *Int. Rev. der Ges. Hydrobiol.* **67**(4):491-515.

Menzie, C.A., G. Mariani, and J. Rythcr, Jr. 1981. Seafloor mapping system applied to biological, environmental surveys. *Sea Technol.* **22**(2):15-16.

Menzie, C.A. 1981. Production ecology of Cricotopus sylvestris Fabricius (Diptera: Chironomidae) in a shallow estuarine area. *Limnol. Oceanog.* **26**(3):467-481.

Mauer, D., W. Leathem and **C.A. Menzie**. 1981. The impact of drilling fluids and well cuttings on polychaete feeding guilds from the U.S. northeastern continental shelf. *Marine Pollution Bull.* **12**(10):234-347.

Menzie, C.A. 1980. The potential significance of insects in the removal of contaminants from aquatic systems. *Water, Air and Soil Pollution* **13**:473-479.

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Menzie, C.A. 1979. Growth of the aquatic plant Myriophyllum spicatum in a littoral area of the Hudson River Estuary. *Aquatic Botany* 6:365-375.

Mulligan, H.F. and **C.A. Menzie.** 1978. How to prepare environmental reports for drilling on the OCS (outer continental shelf). *Oil and Gas J.*, pp. 86-87.

Published Proceedings, Conferences and Symposia

Cura, J.J. and **C. Menzie.** 1996. Methodologies for Ecological Risk Assessment: The Overall Process and Recent Advances. Presented at the Water Environment Federation 69th Annual Conference & Exposition. Conference Workshop #12 - Ecological Risk Assessment: Why and How - An Important Tool in Environmental Decision Making. October 5-9, Dallas, Texas.

Menzie, C.A. 1995. Problems in Ecological Assessment Related to Contaminated Site Management. In Proceedings of the NRC - CNRC Workshop, Toxicity Testing Applied to Soil Ecotoxicology, 28-29 November, 1995, Montreal, Quebec. NRC's Biotechnology Research Institute in collaboration with Environment Canada and the Quebec Ministry of Environment and Wildlife. pp. 26-27.

von Stackelberg, K., **C.A. Menzie,** and J.J. Cura. 1995. Risk Assessment: Helping to Focus Risk Management Objectives for MGP Sites. *Land Contamination & Reclamation.* (special issue). **3**(4):24-29. Presented at the International Symposium and Trade Fair on the Clean-up of Manufactured Gas Plants, September 19-21, Prague, Czech Republic.

Menzie, C.A. and J.J. Cura. 1991. Environmental evaluations at hazardous waste sites. In Proceedings of the HMC-Northeast '91 Conference in Boston, Massachusetts, July 10-12, 1991, by the Hazardous Materials Control Research Institute. Greenbelt, MD, Hazardous Materials Control Research Institute, pp. 77-84.

Menzie, C.A. and J. Cura. 1991. Loadings of pollutants in Massachusetts Bay. Presented at U.S. Environmental Protection Agency Conference on Estuaries, February 24-26, Sarasota, FL.

Burmaster, D.E., K.M. Thompson, **C.A. Menzie,** E. Crouch and T. McKone. 1990. Monte Carlo techniques for quantitative uncertainty analysis in public health risk assessment. In *Proceedings of the 1990 HMCRI Conference,* New Orleans, LA, by the Hazardous Materials Control Research Institute. Greenbelt, MD, Hazardous Materials Control Research Institute, pp. 215-21.

Menzie, C.A. 1988. Application of Connecticut's Aquatic Toxicity Program. Panel discussion and presentation to the Second Annual Workshop of the Connecticut Forum of Regulated Environmental Professionals, June 2, New Haven, CT.

Menzie, C.A. and D.E. Burmaster. 1988. Overview of soil clean-up levels and risk based decision making. Presented at the HazMat '88 Conference, June 14-16, Atlantic City, NJ.

Menzie, C.A. and D.E. Burmaster. 1988. Evaluation of environmental risk assessment methods. Presented at the Ninth Annual Meeting of the Society of Environmental Toxicology and Chemistry, November 13-17, Arlington, VA.

Menzie, C.A. 1988. The use - and possible misuse - of risk assessment as part of overall site management. Presented at the second Hazardous Waste Superfund Conference in San Francisco and Washington, D.C. 1988. Andrews Associates.

Burmaster, D.E., B. Murphy, J. Gushue and **C.A. Menzie.** 1987. A risk assessment for the Baird & McGuire Superfund Site. Presented at the Hazardous Materials International Conference, Washington, D.C.

Menzie, C.A., J.J. Cura, R. Gillmor, G. Mariani and S. Wilson. 1983. Research needs related to ocean disposal. Presented at the Ocean Waste Management Conference at the University of Rhode Island, May, Kingston, RI .

Menzie, C.A., J. Ryther, Jr., L.F. Boyer, J.D. Germano and D.C. Rhoads. 1982. Remote methods of mapping seafloor topography, sediment type, bedforms, and benthic biology. In Oceans '82 Conference Record. IEEE Publication Number 82CH1827-5. Piscataway, NJ, IEEE Service Center, pp. 1046-1051.

Gillmor, R.B., **C.A. Menzie** and J. Ryther, Jr. 1981. Side-scan sonar and T.V. observations of the benthic environment and megabenthos in the vicinity of an OCS exploratory well in the Middle Atlantic Bight. In Oceans '81 Conference Record. IEEE Publication No. 81CH1685-7. Piscataway, NJ, IEEE Service Center.

Menzie, C.A., D. Frye and R.N. Hazelwood. 1980. OTEC-1 Environmental Monitoring Program. In *Proceedings of the Seventh Ocean Energy Conference*, June 1980, Washington, D.C., by conference sponsor.

Menzie, C.A. and J. Ryther, Jr. 1980. Diego Garcia (Indian Ocean): An Atoll estuary. Presented at the New England Estuarine Research Society at the University of Rhode Island, Spring Session, Kingston, RI.

Mulligan, H.F. and **C.A. Menzie.** 1979. Phytoplankton as tracers of water masses on and around Georges Bank. Presented at the Second Informal Workshop on the Gulf of Maine and Scotian Shelf, May, Dalhousie, Nova Scotia.

Menzie, C.A., *et al* 1976. The environmental impact of the Clean Water Act on the Hudson River Estuary. Presented at the Fourth Hudson River Environmental Symposium.

Menzie, C.A., R. Hyman, and B. Woodward. 1976. Investigations of the chironomid fauna of Haverstraw Bay. Presented at Fourth Hudson River Environmental Symposium.

Menzie, C.A., D. Logan and J. Matousek. 1976. Benthic investigations in the Hudson River Estuary. 1972-1974. Presented at the 24th Annual Meeting of the North American Benthological Society, Madison, WI.

Technical Reports

Dr. Menzie has written more than 100 technical reports as part of various programs. Information on these reports is available upon request.

JEROME J. CURA, Ph.D., LSP

EDUCATION:

Ph.D.	1981	Biological Oceanography, University of Maine
M.S.	1974	Ecology, Northeastern University
B.A.	1971	Biology, College of the Holy Cross

CONTINUING EDUCATION AND CERTIFICATION:

Licensed Site Professional, State of Massachusetts, 1994

OSHA Certified 40-Hour Training and Refresher Courses in Personnel Protection and Safety for Hazardous Waste Site Activities, 1988

Certificate, Modeling of Fate and Effects of Toxic Substances in Surface and Ground Waters, Manhattan College, New York, NY, 1986

EMPLOYMENT HISTORY:

1988-Present — Menzie-Cura & Associates, Inc., Principal. Responsible for direction and management of environmental assessment and environmental risk assessments of toxic chemicals and conventional pollutants in groundwater, freshwater, marine and wetland systems. Experienced in site assessment, exposure assessment, and application of environmental fate and effects models.

1986-1988 — Goldberg-Zoino & Associates, Inc. Senior Environmental Specialist. Responsible for management of environmental site assessment program and design and conduct of environmental risk assessments including: the potential effects of toxics in groundwater at industrial sites including oil distribution facilities, paint and stain manufacturers, solvent storage areas, and steel plants; the potential effect of nutrient input from sewage treatment plants to estuarine and aquatic ecosystems; prediction of fate and effects of toxics in ecosystems using partitioning models; and development of monitoring programs to assess potential effects of toxics and nutrient inputs to coastal and aquatic ecosystems.

1980-1987 — Middlesex Community College. Lecturer. Environmental Law, Biological Oceanography.

1979-1986 — EG&G Environmental Consultants. Senior Scientist. Designed and conducted studies to assess the effects of industrial and civil activities upon marine and aquatic ecosystems. Developed environmental monitoring program to assess risk associated with a coal gasification plant. Worked closely with physical oceanographic staff to develop and conduct hydrological and biological studies on George's Bank. Prepared environmental reports concerning the potential effects of petroleum development in coastal and offshore ecosystems in the mid-Atlantic, George's Bank, and the Bering and Chukchi Seas. Designed and conducted baseline monitoring program to assess the potential effects of OTEC technology upon phytoplankton of Hawaiian Islands. Conducted programs to assess environmental effects of thermal and toxic effluents on fish habitats. Prepared reviews of ocean disposal and ocean dumping.

1975-1978 — University of Maine. Research Assistant. Conducted studies of nutrient uptake in phytoplankton in Maine coastal waters. Participated in oceanographic cruise to Peru upwelling region under National Science Foundation's Coastal Upwelling Ecosystems Analysis Program.

1973-1975 — Massachusetts Bay Community College. Full-Time Faculty Member. General Biology and Anatomy.

PROFESSIONAL AFFILIATIONS:

Licensed Site Professional Association (Board on Directors)
North Atlantic Chapter SETAC (Board of Directors)
New England Estuarine Research Association
American Geophysical Union
Society for Risk Analysis
Water Pollution Control Federation
American Society of Limnology and Oceanography

NATIONAL AND INTERNATIONAL COMMITTEES, WORKSHOPS, AND DISTINCTIONS:

USEPA/USCOE Technical Support to Task Force on Managing Dioxin Contaminated Sediment
Sigma Xi
Phi Sigma

PUBLICATIONS:

Book Chapters

Cura, J.J., 1998. Ecological Risk Assessment under the Massachusetts Contingency Plan. In: Risk, Resource, and Regulatory Issues – Remediation of Chlorinated and Recalcitrant Compounds, eds. G.B. Wickramanayake and R.E. Hinchee. The First International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, May 18-21, 1998.

Menzie, C.A., **J. Cura,** J. Freshman and S. Svirsky. 1993. Evaluating ecological risks and developing remedial objectives at forested wetland systems in New England. In Application of Ecological Risk Assessment to Hazardous Waste Site Remediation. Water Environment Federation, Alexandria, VA, pp. 89-100.

Menzie, C.A., **J.J. Cura**, R. Gillmor, B. Magnell, G. Mariani, T. Bartholomew, W. Garder and W. Smith. 1989. The Optimum Mix of Pollution-monitoring Platforms: Deepwater Dumpsite-106 Case Study. In M. Champ and K. Park, eds., *Oceanic Processes in Marine Pollution. Vol. 3 - Marine Waste Management: Science and Policy.* Kreiger Publishing Co., Melbourne, FL, pp. 260-76.

Cura, J.J., G. Mariani, C. Ketchum, R. Gillmor, C. Menzie, W. Curtis and B. Tuholke. 1989. Site-selection Criteria for Deep Ocean Disposal of Low-level Radioactive Wastes. In M. Champ and K. Park, eds., *Oceanic Processes in Marine Pollution. vol. 3 - Marine Waste Management: Science and Policy.* Kreiger Publishing Co., Melbourne, FL, pp. 177-85.

Cura, J.J. 1987. The Phytoplankton of George's Bank. In R. H. Backus, ed. *George's Bank and Its Surroundings.* MIT Press, Cambridge, MA, pp. 213-218.

Menzie, C.A., F. Babin, E. Burke, **J.J. Cura,** R. Gillmor, G. Mariani and S. Wilson. 1983. An Assessment of Research Needs Related to Future Ocean Disposal of Wastes. In M. Champ, ed. *Ocean Waste Management: Policy and Strategies*, International Ocean Disposal Series Special Symposium.

Journal Articles

Cura, J.J. 1998. Ecological risk assessment. *Water Environment Research, Literature Review.* 70(4)968-971.

Cura, J.J. 1997. Ecological and health risk assessment. *Water Environment Research, Literature Review.* 69(4)1-5.

Menzie, C.A., M. Hope Henning, **J.J. Cura**, K. Finkelstein, J. Gentile, J. Maughan, D. Mitchell, S. Petron, B. Potocki, S. Svirsky, P. Tyler. 1996. Special report of the Massachusetts weight-of-evidence workgroup: A weight-of-evidence approach for evaluating ecological risks. *Human and Ecological Risk Assessment:* (HERA): 2(2)277-304.

Menzie, C.A., **J.J. Cura** and W.F. Skinner. 1982. Thermal Impact Evaluation for Brunner Island Steam Electric Station: Toward a More Realistic Assessment. *Environ. Monitoring and Assessment* **2**: 301-308.

Published Proceedings, Conferences and Symposia

J. J. Cura. 1998. Ecological Risk Assessment under the Massachusetts Contingency Plan. Presented at the First International Conference on Remediation of Chlorinated and Recalcitrant Compounds. May 18-21, 1998. Monterey, CA.

Metzger, B.H., P.M. Rury, D. Turton, B. Archibald, J. Clark, **J.J. Cura**. 1996. Toward Effective Ecological Risk-Management of Refinery Corrective Action. Presented at the Society of Environmental Toxicology and Chemistry 17th Annual Meeting. November 17-21, 1996. Washington, DC.

Cura, J.J., R.M. Rury, R.P. Christensen, and B.B. Archibald. 1996. Integration of Habitat Quality Ranking into Screening Level Ecological Risk Assessment. Presented at the Society of Environmental Toxicology and Chemistry 17th Annual Meeting. November 17-21, 1996. Washington, DC.

Cura, J.J. Participant in North Atlantic Estuarine Eutrophication Assessment Workshop. October 2-3, 1996. Boothbay Harbor, Maine.

Cura, J.J. and M. Studer. 1996. Measurement of PAH Loadings to Massachusetts Bay from Various Waterborne Sources. Presented at the Water Environment Federation 69th Annual Conference & Exposition. October 5-9, Dallas, Texas.

Cura, J.J. and C. Menzie. 1996. Methodologies for Ecological Risk Assessment: The Overall Process and Recent Advances. Presented at the Water Environment Federation 69th Annual Conference & Exposition. Conference Workshop #12 - Ecological Risk Assessment: Why and How - An Important Tool in Environmental Decision Making. October 5-9, Dallas, Texas.

von Stackelberg, K., C.A. Menzie, and **J.J. Cura**. 1995. Risk Assessment: Helping to Focus Risk Management Objectives for MGP Sites. *Land Contamination & Reclamation*. (Special Issue). 3(4):24-29. Presented at the International Symposium and Trade Fair on the Clean-up of Manufactured Gas Plants, September 19-21, Prague, Czech Republic.

Menzie, C.A. and **J.J. Cura.** 1991. Environmental Evaluations at Hazardous Waste Sites. In *Proceedings of the HMC-Northeast '91 Conference*, Boston, MA, July 10-12, by the Hazardous Materials Control Research Institute. Greenbelt, MD, pp. 77-84.

Cura, J.J. 1991. Ecological Risk Assessments at Hazardous Waste Sites. Presented to The Boston Bar Association's Hazardous Waste Subcommittee, May Meeting, Boston, MA.

Cura, J.J. 1983. Production on George's Bank. (Invited speaker.) Panel Discussion on George's Bank - New England Estuarine Research Society Spring Meeting, Portland, ME.

Cura, J.J. 1983. The Relationship Between Hydrography and Phytoplankton Species Distribution on George's Bank. Presented as Part of the Bigelow Laboratory for Ocean Sciences Visiting Lecture Series.

Cura J.J., C.N. Flagg and G. Mariani. 1983. Physical Factors Controlling Plankton Production on George's Bank. Presented at the American Geophysical Union Spring Meeting, Philadelphia, PA.

Cura, J.J, and B.A. Magnell. 1981. The Distribution of Primary Production and Phytoplankton on George's Bank. Presented at the Third Annual Symposium on the Oceanography of the Gulf of Maine and Adjacent Seas, University of New Hampshire, Durham, NH.

Cura, J.J. 1974. The Cellulolytic Capability of Several Salt Marsh Fungi. Presented at the Phi Sigma Symposium, Northeastern University Marine Science Institute, Nahant, MA.

Technical Reports

This section lists only major technical reports. Dr. Cura has written numerous reports on aquatic toxicity, ecological studies, and estuarine environments.

Cura, J.J., and J. Freshman. 1996. Identification of Massachusetts Bays Embayments at Risk of Eutrophication. Prepared for Massachusetts Bays Program, Office of Coastal Zone Management.

Cura, J.J., C. Menzie and J. Borchardt. 1985. An Overview of Industrial Waste Disposal in the Ocean. Prepared for the United States Congress, Office of Technology Assessment.

Cura, J.J., J. Borchardt, and C. Menzie. 1984. Projected Ocean Dumping Rates in the Year 2000. Prepared for the National Oceanic and Atmospheric Administration (NOAA), National Marine Pollution Program Office

Cura, J.J. (with EG&G Staff). 1982. An Evaluation of the Effects of Thermal Discharge from the Brunner Island Stream Electric Station on Representative Important Fish Species - 316a Demonstration. Prepared for Pennsylvania Power and Light Company.

Flagg, C.N., B. Magnell, D. Frye, **J. Cura,** S. McDowell and R. Scarlet. 1982. Interpretation of the Physical Oceanography of George's Bank. Prepared for the United States Bureau of Land Management. National Technical Information Service (NTIS) Publication Number EG&G 82-B4569.

Cura, J.J. (with EG&G Staff). 1982. Assessment for Future Environmental Problems - Ocean Dumping. Prepared for the United States Environmental Protection Agency, Office of Strategic Assessment and Special Studies.

Cura, J.J. 1981. The Thermal and Physical Suitability of the Pigeon River Downstream of Canton, North Carolina as Smallmouth Bass Habitat. Prepared for Champion Paper Company.

Cura, J.J. (with EG&G staff). 1981. Development of Site-selection Criteria for Disposal of Low-level Radiation Wastes off the East Coast of North America. Prepared for United States Environmental Protection Agency, Office of Radiation Programs.

Roux Associates, Inc.

EE/CA and RI/FS Reports

Project Team Resumes

John R. Loper, P.E.
Vice President/Principal Engineer

Technical Specialties:
Investigation and remediation of soil and ground-water contamination problems. Treatment system design and operation. Regulatory agency negotiations, permitting and compliance audits. Waste minimization and control.

Experience Summary:
23 years of experience: Vice President of Roux Associates, Inc., Business Director of FMC Aquifer Remediation Systems and variety of environmental, manufacturing, marketing and safety positions at FMC Corporation. Directed and participated in CERCLA RI/FS/RD projects, RCRA closures and corrective action program projects, property transfer investigations and cleanups, NPDES audits and SARA Title III evaluations, waste minimization surveys, air permitting and environmental impact studies, emissions control design and operation, regulatory agency negotiations, and expert witness testimony.

Credentials:
MS Chemical Engineering, West Virginia College of Graduate Studies, 1979
BS/BA Chemical Engineering/Applied Science, Lehigh University, 1973 with Honors
Professional Engineer (TX, LA, AL, GA, PA, NJ, NY, DE, NC)
Licensed N-2 Industrial Wastewater Treatment System Operator (NJ)
Certified to Perform UST Services (TX, LA, NJ)
Tau Beta Pi (Engineering Honors Society)
Phi Beta Kappa (National Honors Society)
Who's Who in Finance and Industry (1993), in the East (1992), and Among Rising Young Americans in American Society & Business (1992)

Professional Affiliations:
National Society of Professional Engineers
American Institute of Chemical Engineers
National Ground Water Association
Environmental Law Institute
American Water Works Association
Water Environment Federation
National Association of Corrosion Engineers
International Platform Association
Texas Hazardous Waste Management Society
Association of Chemical Industry of Texas
Texas EnviroMentor Volunteer
AIChE Catalyst

Publications:
Real World Tips from a Veteran Oil Marketer - Presented to US Oil Week Seminar, 1993
A Guide to ECRA, Roux Associates, 1986
In-Situ Treatment of Ground Water - Presented at Hazardous Materials Spills Conference, 1986
In-Situ Ground-Water Remediation (Hazpro '85)

Key Projects:
- Principal-in-charge for design and operation of numerous ground-water, soil and air treatment systems. System components have included ground-water pumping, air sparging, vapor extraction, catalytic/thermal oxidation, ion exchange, UV oxidation, thermal desorption, and *in-situ* biological and chemical treatment processes. Constituents treated have included chlorinated solvents, petroleum hydrocarbons, coal tar chemicals, polychlorinated biphenyl (PCB) compounds, pesticides, and heavy metals.
- Principal-in-charge for conducting compliance audits, SARA Title III evaluations and waste minimization studies for SOCMI clients.
- Principal-in-charge for developing air emission inventories and permitting for batch and continuous chemical, pharmaceutical and heavy manufacturing processes.
- Principal-in-charge for RCRA closure projects, post-closure monitoring programs, corrective action program facility investigations (RFIs), corrective measures studies (CMSs), and remedy implementation projects.
- Principal-in-charge for CERCLA and state-listed site emergency response actions, remedial investigations (RIs), feasibility studies (FSs), remedial designs (RDs), and remedy implementation projects for private-sector clients nationwide.
- Principal-in-charge for business acquisition and divestiture due diligence evaluations, property transfer audits, investigations and cleanup programs for chemical, pharmaceutical, petroleum, and manufacturing clients.
- Principal-in-charge for investigation and remediation of petroleum hydrocarbon contamination problems at more than 50 distribution terminals and retail gasoline stations.
- Negotiated air, water, and solid/hazardous waste matters with USEPA and regulatory agencies in AL, AK, CA, CT, DE, FL, LA, MA, MD, NC, NJ, NY, OH, PA, SC and TX.
- Provided litigation support and expert witness testimony for private-party suits and insurance matters involving the release of hazardous materials.
- Directed new business venture to develop and commercialize *in-situ* biological and chemical treatment technologies for contaminated soils and ground water.
- Conducted health and safety audits and process hazard reviews for 21 mining, chemical manufacturing, and distribution facilities throughout the United States.
- Directed technical support for start-up of $10MM pollution abatement project to meet NPDES discharge requirements at a chemical manufacturing facility.

John D. Daniels, P.G.
Principal Hydrogeologist

Technical Specialties:
Voluntary Cleanup Program (VCP) closures; environmental compliance audits; AST/UST removal and closures; in-ground hydraulic lift removal and closures; Phase I / Phase II assessments; regulatory agency negotiations; groundwater/soil remediation design; RCRA corrective action; expert witness support; GIS map products; oil spill assessments; and RI/FS investigations; SPCC plan preparation, and hazardous chemical reporting under EPCRA.

Experience Summary:
16 years of experience; Principal Hydrogeologist at Roux Associates, Inc., Senior Project Manager at ENTRIX, Inc., Project Geologist at International Technology (IT Corp.), and Field Geologist at National Soil Services. Successfully coordinated and managed VCP, AST, UST, and in-ground hydraulic lift closures; participated in groundwater and soil remediation design projects; RCRA corrective action, regulatory agency negotiations; and expert witness support.

Credentials:
MLA, International Studies, University of St. Thomas, 1996
BS, Geography, Valparaiso University, 1982
BS, Geology, Indiana University, 1982
Professional Geologist (Arkansas, Indiana, and Florida)
UST Consultants Certification (Oklahoma)

Professional Affiliations:
American Association of Petroleum Geologists
(Div. of Environmental Geosciences)
National Ground Water Association

Publications:
The Use of ATV-Mounted Hydraulic Equipment, Field Screening, and Mobile Laboratories to Effectively Delineate Contaminant Releases and Guide Remedial Activities at Industrial Facilities. Presented at Southern Gas Association Conference, June 1993.

Key Projects:

- Project Manager for two commercial sites entered into the TNRCC's Voluntary Cleanup Program (VCP). Work included the completion of a subsurface investigation, report, and interfacing with TNRCC personnel. The sites were closed under Risk Reduction Standard #2 and were two of the first sites closed under the VCP.

- Project Manager/Hydrogeologist for a petroleum bulk storage terminal facility in south-central Indiana. Assisted in developing a remedial alternative evaluation in response to subsurface soil and groundwater contamination with petroleum-based products. Work included evaluating and screening several remedial alternatives applicable to site conditions. Also, identified additional data requirements necessary to refine and complete the evaluation for the selection of the recommended alternative. These additional requirements included monitor well sampling, soil borings, and aquifer pump tests. These data were utilized to complete a detailed remedial alternative evaluation.

- Project Manager for the rehabilitation of a 23-acre landfill clay cap in Houston, TX. The work included the placement of a minimum two-foot thick layer of compacted clay in areas where the existing cap had eroded. The clay met the TNRCC specifications for use as cap construction material. Low areas of the cap were filled with clean, select fill and with clean topsoil. The purpose of the project was to bring the landfill cap back into compliance with the original closure plan. Other work included a soil-gas survey, monitor well sampling, and report preparation.

- Project Manager for UST investigation/closures and oil/water separator closures at Los Angeles International Airport, Houston Hobby Airport, Piedmont-Triad International Airport, Newark International Airport, and Northern Maine Regional Airport.

- Assisted in the development and management of the Administrative Record for the *Morris J. Berman* oil spill in San Juan, Puerto Rico. Other duties involved shoreline intertidal community assessments, seagrass bed injury assessment of the coral reef, and beach-use overflights. Provided technical review of government documents and coordinated the procurement of databases for Geographic Information Systems (GIS) map products.

- Project Manager for a Phase II subsurface assessment completed at four oil and gas fields in Jackson, Colorado and Calhoun Counties, Texas. Primary constituents of concern included hydrocarbons, metals and chlorides. In-situ soil and groundwater samples were collected with an all-terrain vehicle (ATV) hydraulic drilling rig. Other work included report preparation, recommending remedial alternatives, and preparing remedial cost estimates.

- Project Manager for the installation and operation of a groundwater recovery system near Sulphur, LA. Three 8-inch diameter PVC recovery wells were installed for the recovery of free-phase diesel fuel. Other work included the installation of total fluid recovery pumps, controllers, flow meters, and manifold piping.

- Project Manager for the technical oversight of P&A, installation and sampling, and geophysical logging of monitor wells at four natural gas compressor stations in New Mexico. Other work included report preparation and regulatory agency interaction on a weekly basis. Work was completed as part of an agreed Consent Order with the USEPA.

- Managed and assisted in numerous site environmental audits of commercial, residential, and industrial properties for pre-sale and pre-foreclosure investigations.

- Project Coordinator for preparing GIS map products for oil spills, pipeline ruptures, and natural resource damage assessment (NRDA)-related projects.

John D. Daniels, P.G.
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- Project Manager for a subsurface groundwater plume delineation study in San Angelo, TX. Duties included supervising drilling operations under difficult field conditions and collecting/analyzing in-situ groundwater samples from three separate water-bearing zones. Depths of the water-bearing zones ranged from 35 to 90 feet. Final duties included the assimilation/evaluation of field and lab data for final report preparation.

- Project Manager for the removal and closure of in-ground hydraulic lift systems at multiple active and inactive automobile dealerships and repair facilities.

- Project Manager for the delineation of dissolved-phase and free-phase hydrocarbons at an oil field manufacturing facility in Midland, TX. Work included the installation and sampling of 40-foot monitor wells, completing a one-mile radius water well survey, regulatory agency interaction, report preparation, and development of remedial alternatives.

- Assisted in the supervision of the RI/FS field program for the Oil Midland Superfund project in Ola, Arkansas. Duties included supervising drilling operations and the installation of shallow (20 feet) and deep (40 feet) monitor wells and piezometers. Other duties included falling head field permeability tests, monitor well development and sampling, waste lagoon sampling, aquifer pump test, assimilation of field and lab data, and final report preparation. This work was completed for the Arkansas Department of Pollution Control and Ecology.

- Assisted in the supervision of the RI/FS field program for the Odessa Chromium II Superfund project in Odessa, TX. Duties included the supervision of drilling operations and the installation of shallow/deep monitor wells. Other duties included performing and conducting a water well inventory study as part of the remedial investigation. The study involved sighting and sampling over 400 water wells around the known contamination area. Final duties included the assimilation of field and lab data and report preparation for the Texas Water Commission.

- Developed and implemented two remedial investigation projects at oil field pipe cleaning/inspection facilities in Pearland, TX and Bay City, TX. Work included sampling on-site drums of unknown contents, sumps, and soils affected with petroleum-based hydrocarbons and solvents. Follow-up work included proper off-site disposal of these materials and preparing the final documentation report.

- Project Manager for the plugging and abandonment (P&A) of two deep (>200 foot) water wells at an abandoned wood treatment facility near Lufkin, TX. P&A was completed in accordance with State of Texas rules and regulations. Other work included the proper handling and disposal of 50 drums containing affected drill cuttings and fluids.

- Assisted in the design and construction of a free-phase hydrocarbon recovery trench (>100 ft. in length) at a natural gas compressor station near Longview, TX. Other work included the preparation of quarterly monitoring reports and trench operation and maintenance.

- Prepared and implemented a RCRA Facility Investigation (RFI) at Texaco's Port Arthur, TX refinery. The RFI included subsurface investigations at 23 surface impoundments and six landfills. This work was completed at the request of the Texas Water Commission.

- Prepared expert witness summary reports for two environmental litigation cases in Fort Collins, CO and Houston, TX. Completed depositions, and both cases were subsequently settled out-of-court.

- Project Manager for conducting an environmental compliance audit of a Research and Development (R&D) facility within a major chemical plant refinery in Baytown, TX. Work included determining the level of compliance with state/federal environmental rules and regulations, and identifying any major areas of environmental compliance that were being overlooked or not being properly addressed. The scope of work that was completed consisted of 1) collected and reviewed available documents and permits; 2) performed a physical inspection; 3) conducted employee interviews; and 4) reviewed audit findings with R&D personnel and followed up with a written report.

- Project Manager for the preparation of SPCC Plans for ten (10) asphalt and ready-mix concrete plants in northeast Texas and southeast Oklahoma.

- Project Manager for the preparation of Tier II report forms for multiple industrial facilities in Texas to comply with Section 312 of the federal EPCRA rules and regulations.

- Project Manager for conducting an environmental compliance audit and a Phase II subsurface investigation at a Houston-based candle manufacturing facility. The work was completed as part of a real estate transaction. The facility was entered into the TNRCC VCP.

ROUX

Professional Profile

Dennis Colton, P.G.
Principal Hydrogeologist

Technical Specialties:
Investigation and remediation of soil and ground-water contamination. Negotiations with regulatory agencies. Expert testimony/litigation support. Environmental site assessments.

Experience Summary:
18 years of experience: Principal Hydrogeologist at Roux Associates; Principal Scientist at Geraghty & Miller. Successfully directed CERCLA and RCRA investigations, ECRA/ISRA studies, NAPL investigations, expert testimony/litigation support projects and environmental site assessments throughout the United States and Canada.

Credentials:
M.S. Hydrogeology, Adelphi University, 1978
B.S. Geology, University of Maryland, 1972
Certified Professional Geologist, A.I.P.G.
Certified Professional Geologist, Missouri and Pennsylvania

Professional Affiliations:
Association of Ground Water Scientists and Engineers (NWWA)
American Institute of Professional Geologists

Key Projects:

- Directed an RI at a 36-acre state superfund site in Illinois that includes a 22-acre industrial landfill. The project included the successful construction and operation of a pilot treatment plant used to demonstrate that impacted ground water could be treated biologically. This multi-task project was completed 2 months ahead of schedule and 10 percent under budget.
- Served as project director for the completion of the Remedial Design/Remedial Action (RD/RA) phase of work at a CERCLA site in Indiana. Successfully negotiated cost-saving strategies that eliminated several areas of concern thus reducing the areas designated for remediation via a soil vapor extraction system.
- Negotiated a limited scope of work under a 106 Order at a 450-acre CERCLA site in New York. Sampling strategies were negotiated with USEPA to limit the number of samples collected to characterize soil, ground water, surface water and sediment. The agency's acceptance of these strategies limited the total RFI costs and compressed the RI schedule to the satisfaction of all parties.
- Successfully managed the ground-water investigation of an RFI/CMS at a large waste disposal facility in New Jersey saving the client $500,000 in investigative costs. Reduced the number of SWMU's by combining them into waste management areas. A global ground-water approach eliminated the need for unit specific ground-water investigations.
- Directed the RCRA closure of a chlor-alkali facility at a major chemical manufacturing facility in Illinois. A risk assessment was used to develop an alternative cleanup level for mercury which limited the volume of soil to be remediated. The agency was convinced that only dissolved metals were required to be analyzed for in ground water, and mercury was not detected. Therefore, ground-water remediation was not warranted. This approach saved the client $350,000.
- Successfully completed an RFI for a 100-acre chemical plant located in Missouri. A ground-water model was constructed which demonstrated that there was only de minimis risk to a nearby river that is used as a potable water supply.
- Coordinated both the investigation of a well field in Massachusetts that had become contaminated and an exploratory drilling program for a new supply well in an adjacent area that was protected from commercial/industrial development. Investigative efforts lead to the identification of the responsible party.
- Conducted an investigation of a contaminated industrial property in Saratoga County, New York that included the installation of an on-site ground-water recovery well and long-term monitoring of off-site private bedrock wells for both ground-water quality and depletion of the available resources.
- Designed an LNAPL recovery system using a slurry wall at a chemical plant in Massachusetts. The system has effectively prevented product from entering the river to the satisfaction of the Massachusetts Department of Environmental Protection (MADEP).
- Designed a DNAPL recovery system above a clay confining unit at a chemical plant located adjacent to the Delaware River. The DNAPL was successfully recovered by taking advantage of the local geologic features at the site.
- Directed investigations at six former manufactured gas plant (MGP) sites in New Jersey. Hot spots are being remediated and biodegradation is being utilized to remediate off-site ground-water impacts.
- Directed a hydrogeologic investigation of soil/ground-water contamination in overburden/bedrock at an ISRA site in New Jersey (dye manufacturing facility). Air sparging was selected to remediate the overburden aquifer which will result in significant cost savings and a reduction in the length of operation. Natural remediation will be used to address BTEX compounds in the bedrock rather that an expensive pump and treat program that was proposed by the previous consultant.
- Provided litigation support to a major pigment manufacturing company alleged to have contaminated a municipal well field. A ground-water model was used to demonstrate that our client could not have impacted the well field. The suit was settled in our client's favor.
- Provided litigation support to an aluminum manufacturing company in connection with a private cost recovery litigation case. The aluminum manufacturing company is seeking to recover investigative and remedial costs believed to be covered by its insurance policies. The case is currently active.
- Served as project manager for over 100 environmental site assessments in the United States and Canada. Site investigations have included RCRA and OSHA compliance auditing, as well as subsurface contaminant investigations.
- Conducted a Phase II investigation at a printing facility on Long Island which has resulted in the site being delisted from the New York State Department of Environmental Conservation's (NYSDEC) list of inactive hazardous waste sites.

Dennis Colton, P.G.
Principal Hydrogeologist

- Designed a compliance monitoring well network and prepared a closure plan for a RCRA hazardous waste storage facility located within a chemical plant in Illinois. Rather than remediate contaminated ground water at this location, which is upgradient of former disposal areas, the regulatory agency was convinced that ground-water quality should be addressed on a site-wide basis. This strategy saved our client $250,000.
- Provided consulting services at approximately 15 sites in Connecticut proposed for industrial/commercial development. Each of the projects required a critique of the developer's plans with a special emphasis on ground water availability in bedrock aquifers and ground-water quality issues as they related to the development of the sites.
- Conducted hydrogeologic investigations at several golf courses in Westchester County, New York. Each investigation included a fracture trace analysis, the selection of test well locations, installation of the test well, and completion of an aquifer test.
- Performed a hydrogeologic study for a Town in Westchester County, New York that required an expansion of their water supply which was derived solely from ground water. The project included exploratory drilling in both sand and gravel and bedrock aquifers, conducting aquifer tests, and predictions of long-term well yields. The project was successfully completed on time and under budget as a new supply well was located near an existing water main.
- Managed a hydrogeologic investigation of a site in Michigan and assisted the client in reducing the property purchase price by determining the extent of contamination and cost of remediation resulting from a leaking underground storage tank on the adjacent property.
- Designed a DNAPL recovery system above a clay confining unit at a chemical plant in New York. The DNAPL was successfully recovered and a ground-water pump and treat system was installed downgradient which precluded nearby residential wells from being impacted.
- Managed a Phase II investigation of a fuel oil pipeline leak, and the subsequent installation of a ground-water recovery system for a site in eastern Pennsylvania. The site was successfully remediated and the recovery system removed.
- Currently evaluating the technical feasibility to recover DNAPL and its impact on the environment if left in place at an industrial site in Illinois. A risk assessment is being used to convince the state agency that remediation of the free product is not feasible.
- Directed an evaluation of remedial alternatives selected by NJDEP for the BEMS Landfill in Southampton Township, New Jersey for a PRP Group. The project required a careful critique of the RI/FS which was found to be insufficient. The NJDEP is currently evaluating a proposal for in-situ remediation of the ground water via air sparging/biosparging rather than the agency's initial choice of a traditional pump and treat system. The in-situ remedy is believed to represent a savings of 20 million dollars due to less capital for construction and 20 to 25 fewer years of O&M costs.
- Provided litigation support to a PRP for the Buzby Landfill in Voorhees Township, New Jersey. Our evaluation took into consideration the use of an adjacent (upgradient) landfill by a large chemical corporation. Based on an analysis of the fate and transport of metals at the site, the suit was settled in our client's favor.
- Provided litigation support to a PRP Group for the LiPari Landfill (No. 1 NPL site). Issues include whether 50 percent of the remedial costs were necessary expenditures. The case is pending.
- Managed the hydrogeologic investigation at the Florence Land Recontouring Landfill in Florence, New Jersey. Demonstrating that the existing cap met state standards; however, the leachate collection system needed to be upgraded.
- Provided litigation support at the request of an insurance company's counsel to evaluate the costs proposed for the remediation of soil and ground water (onsite and offsite) at numerous oil terminals, refineries and retail gasoline service stations. The case is currently active.
- Provided litigation support at the request of an insurance company's counsel to evaluate the costs proposed by a PRP at Superfund sites in New Jersey and Pennsylvania with regard to remediation of on-site and off-site ground water, on-site soil and off-site wetlands.

Lance W. Richards, P.E.
Senior Engineer

Technical Specialties:

Environmental Project Management and Contractor Oversight. Cost Estimation and Proposal Preparation for various environmental projects. Remediation system design in both in-situ and ex-situ environments utilizing various remedial technologies. Aquifer test setup and analysis of aquifer test data. Setup and calibration of ground-water flow models. Preparation and implementation of RCRA Facility Investigations (RFI) and Corrective Measures Studies (CMS). Document preparation for state and federal regulated facilities. Regulatory agency negotiations interface.

Experience Summary:

10 years of experience: Senior Engineer at Roux Associates, Inc.; Project Manager and Senior Engineer at ENSR; Senior Environmental Engineer at Dupont Environmental Remediation Services (DERS); Project Engineer at Ogden Environmental; Staff Engineer at Law Engineering.

Credentials:

BS - Civil Engineering, University of TX at Austin, 1988
Licensed Professional Engineer: TX; LA
OSHA HAZWOPER Training
OSHA Supervisor Training

Professional Affiliations:

American Society of Civil Engineers
National Water Well Association
Texas Society of Professional Engineers

Publications:

1991 - Prepared Current Conditions Report of a major refinery in Bllings, Montana, and presented it to United States Environmental Protection Agency (USEPA) Region VIII.

1993 - Prepared an Addendum to a 1990 RFI Workplan and presented it to USEPA, Region VI.

1994 - Presented a Horizontal Well Remediation Plan to USEPA, Region VI.

Key Projects:

- Prepared a Current Conditions Report of an industrial site in Billings, Montana. Developed and conducted a hydrogeologic investigation of the uppermost unconfined aquifer at the site as a part of the interim measures which was mandated by USEPA, Region VIII.
- Prepared technical specifications for the demolition of a former chemical manufacturing facility.
- Developed and conducted an aquifer testing program at a chemical plant in Orange, TX to determine hydraulic parameters of a shallow, confined aquifer prior to a corrective measures study.
- Designed landfill cap configurations for the closure of four waste treatment ponds in Beaumont, TX. Design considerations included cap geometric options, use of geosynthetics, erosion protection, regulatory requirements, and total construction costs. Prepared the hydrology and hydraulic calculations necessary to design the site storm sewer system for the 100 year storm. Performed geotechnical calculations to ensure adequate factors of safety pertaining to consolidation, slope stability, and bearing capacity.
- Developed and conducted an aquifer testing and tidal study program at a chemical plant in LaPorte, TX., prior to performing a corrective measures study. The site was contaminated with dense, non-aqueous phase liquid (DNAPL).
- Developed the specifications for a 1,200 foot Horizontal Recovery Well and supervised the well installation at a site in LaPorte, TX. The purpose of the well was to remediate DNAPL.
- Prepared a Spill Prevention Control and Counter- measure (SPCC) plan and an Installation Spill Contingency Plan (ISCP) for a military base in Fort Campbell, Kentucky.
- Designed a ground-water remediation system at a facility in Nashville, TN, using "Pump and Treat" technology. This system involved ground-water extraction, product / water separation, water treatment, and subsurface injection.
- Designed an ex-situ vapor extraction/bioremediation system for hydrocarbon contaminated soils in Memphis, TN. The system operated for approximately two years prior to disposing of the soils at a local landfill.
- Developed Work Plans for Underground Storage Tank (UST) removals/replacements, and supervised the contractors during implementation.
- Estimated future remediation-related costs and reviewed existing cost estimates at industrial facilities in Texas and Ohio for insurance litigation purposes. Developed "best case", "expected case", and "worst case" scenarios based on the selection of remedial technology and regulatory requirements.

ROUX

Professional Profile

Mark N. Smith, P.G.
Project Hydrogeologist/Scientist-Health & Safety Coordinator

Technical Specialties:

Environmental site assessments, remedial investigations, hydrogeologic evaluations, and regulatory compliance.

Experience Summary:

10 years experience: Project Hydrogeologist/Scientist at Roux Associates, Inc.; Hydrogeologist at Em Tech Environmental Services; Hydrogeologist at Applied Earth Sciences, Inc. Managed several UST sites, conducted field work for several RCRA sites for industrial clients, managed TNRCC LPST Emergency Response for Em Tech - several sites across south and central Texas.

Credentials:

MS Geology, Northeast Louisiana University, 1986
BS Geology, Northeast Louisiana University, 1983

Professional Licenses:

American Institute of Professional Geologists, C.P.G. #10117
Professional Geologist: AL, (License #124)
Professional Geologist: GA, (License #1420)
Professional Geologist: NC, (License #1577)
Professional Geologist: AR, (License #1813)
TNRCC Corrective Action Project Manager (CAPM) #1344
LA DEQ-UST Worker #C - 628

Professional Memberships

Alabama Geological Society
Association of Chemical Industry of Texas
Carolina Geological Society
Houston Geological Society
National Ground Water Association

Key Projects:

- Supervised and managed several LPST Emergency Responses for the TNRCC. Installed interceptor trenches to stop gasoline migration into various utilities. Conducted soil boring investigations to best determine contaminant pathways and in support of trench installation. Installed VES unit at one site to effectively remove phase separate hydrocarbon from tank hold.

- Performed many duties for permit compliance at RCRA permitted facilities. Duties included soil borings/monitor well installations, landfill inspections (quarterly/semi-annually), monitoring of leachate levels in landfills, and soil/ground water sampling to document spill remediation. Operated, maintained, and inspected ground-water recovery system at RCRA permitted facility. Assisted with semi- annual and annual reports for TNRCC.

- Team member that completed an RFI Workplan for an industrial site in Alabama. Site was the first RCRA site under ADEM primacy. Assisted with writing and editing of the workplan. Reviewed site data.

- Managed, operated, and maintained remediation systems at several UST sites. Systems included VES only, pump/treat with VES, and air sparging/VES systems. Duties included reporting to clients and regulatory agencies, invoicing, and assisting the accounting department when needed. Obtained air permit exemptions from TNRCC for UST site remediation systems. Prepared and implemented ground-water and soil sampling plans. Prepared proposals and budgets for several sites. Supervised removal of UST systems. Responsible for sampling and reporting.

- Performed field testing to determine best available option for remediation at several sites. Testing included slug tests, step/pump tests, and VES pilot testing. Analyzed data from testing. Designed system layouts and specified equipment for the site based on aquifer test results.

- Permitted, operated, maintained, and monitored a VES site that utilized a catalytic oxidizer to treat off gases. The system removed an estimated 60,000 lbs. of hydrocarbon in 18 months.

- Completed Corrective Action Plan (CAP) for a lubricant blending facility in North Carolina. CAP was approved within one month by NC Dept. of Environment, Health, & Natural Resources. Site is to be remediated using a bio-cell for the affected soil.

- Conducted soil boring/piezometer investigation to delineate a DNAPL release for an industrial client. Investigation covered multiple aquifers and involved coordination with several off-site landowners.

- Conducted sampling of former drying beds in order to obtain risk based closure for an industrial client. Conducted background sampling to determine background concentrations. Completed report for closure based on Texas Risk Reduction Standard #1.

- Performed assessment of former laboratory at a chemical plant. Chemicals of concern were mercury and methylene chloride. Completed risk-based closure report based on TNRCC Risk Reduction Rules Standard #2.

- Performed various duties on a petroleum terminal undergoing remediation under the TNRCC Voluntary Cleanup Program (VCP). Principal author of the Site Investigation Report (SIR), Response Action Work Plan (RAWP), and Conceptual Environmental Assessment Model (CEAM) Report for the site.

- Completed TNRCC VCP Application for an industrial site. Compiled Site Assessment Summary Report for submission with VCP Application. Coordinated site activities with TNRCC. Wrote Site Investigation Report. Installed wells and soil borings.